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The Effectiveness of Hypnotherapy and Behavioral Coaching in Improving Medical Compliance, Altering Locus of Control, and Lowering Anxiety Among Externally-Oriented, Noncompliant Hemodialysis Patients

Michael Tobin
Loyola University Chicago

THE EFFECTIVENESS OF HYPNOTHERAPY AND BEHAVIORAL COACHING IN IMPROVING MEDICAL COMPLIANCE, ALTERING LOCUS OF CONTROL, AND LOWERING ANXIETY AMONG EXTERNALLY-ORIENTED, NONCOMPLIANT HEMODIALYSIS PATIENTS

by

Michael P. Tobin

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VITA

Michael Patrick Tobin is the son of Anna Catherine Tobin and the late James Francis Tobin. He was born April 19, 1950. He has seven brothers and sisters.

Michael completed his elementary education at St. Giles School in Oak Park, Illinois, and completed a semester at Fenwick High School, before his family moved to Syracuse, New York, where his parents had been raised. There he attended Christian Brothers Academy, graduating in 1968.

He then attended Boston College, graduating from the School of Management with a B.S. degree in Finance in 1972. After college, he entered the novitiate of the Paulist Fathers, in New Jersey. While in the novitiate, he participated in the Community Mental Health Project of Roosevelt Hospital in New York, doing volunteer counseling on the West Side of Manhattan. He later left the novitiate and entered the master's program in Counseling and Guidance at Syracuse University in 1973. He obtained his master's degree in 1974, and accepted a position as a junior high school counselor outside Syracuse.

In July, 1975, he married Dorothea O'Connor whom he had met at Boston College, and he moved to Chicago. He took a position as a social worker for the Circuit Court of Cook County, which he held for five years. In September, 1978, he entered the doctoral program in Counseling and Counselor Education at Loyola University of Chicago. He completed an internship in counseling at the Illinois Centers for

Psychotherapy Inc., in 1980, where he also received training in clinical hypnosis. In 1981, he accepted a position as a psychotherapist at the Institute for Motivational Development, in Lombard, Illinois. Then in October, 1981, he was hired as a senior staff therapist at Edgewater-Uptown Community Mental Health Center in Chicago, where he is currently employed in their Sheridan Professional Center.

He received further training in clinical hypnosis from Dr. Billie S. Strauss at the University of Illinois at Chicago, in 1983. He has lectured on hypnosis at Columbia College and at Loyola University of Chicago in the Department of Counseling Psychology and Higher Education and in the Department of Clinical Psychology.

Michael and his family reside in Chicago. He and Dorothea have four daughters, Jessica, Erin, Anna, and Carmel.

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CHAPTER I

INTRODUCTION

End stage renal disease (ESRD) is the most severe stage of kidney failure, in which the patient's kidneys are unable to adequately cleanse the blood of waste products and other foreign matter (Keane, Prue, and Collins, 1981). The patient with ESRD has only two choices available if he/she is to survive: kidney transplantation or kidney dialysis. Hemodialysis, the most common dialysis treatment, is the process of removing accumulated waste materials from a patient's blood and restoring the necessary balance among water, electrolytes, and acidbase by externally circulating the blood through an artificial kidney machine (Battista, 1979, in Hekelmann and Ostendarp, 1979).

The stresses--physical, psychological, and financial--which confront the hemodialysis patient are reported to be severe (Wright, Sand and Livingston, 1966; Crammond, Knight and Lawrence, 1967; Hickey, 1972; Binik, 1983). Fear of death, fear of living with chronic illness, loss of income and/or employment, changes in social status, altered body image, sexual dysfunction, marital difficulties, and other problems reportedly contribute to "one of the most stressful life situations imaginable" (Goldstein and Reznikoff, 1971, p. 1205). One of the greater adjustments required of the hemodialysis patient is adaptation to an extremely difficult medical regimen. Not only must the patient learn to adjust to the intrusive and lengthy procedures

of dialysis itself, but also, he/she must adapt to a stringent dietary regimen, the centerpiece of which is restricted fluid intake (Hartman and Becker, 1978; Procci, 1978; Binik, 1983).

Nonadherence, or noncompliance to the dialysis medical regimen is a problem of considerable magnitude (Katz and Procter, 1969; Kaplan-DeNour and Czaczkes, 1972; Blackburn, 1977) with serious, often fatal consequences (Abram, Moore, and Westervelt, 1971; Barnes, 1976). The problem of hemodialysis noncompliance is an intractable one for medical personnel, and has been addressed by a variety of professional disciplines in the literature (Abram, in Levy, 1974; Borkman, 1976; Blackburn, 1977; Agashua, Lyle, Livesly, Slade, Winney, and Irwin, 1981; Cummings, Becker, Kirscht, and Levin, 1981; Kiriloff, 1981). Among psychological factors related to noncompliance in dialysis populations, locus of control has been identified by a number of investigators (Goldstein and Reznikoff, 1971; Weaver, 1972; Poll and Kaplan-DeNour, 1980; Bollin and Hart, 1982). Typically, noncompliant dialysis patients are reported as more externally-oriented than those patients who routinely adhere to the treatment regimen (Poll and Kaplan-DeNour, 1980). Goldstein and Reznikoff (1971) suggest that such patients view their uncooperative behavior as not having an effect on their medical condition. Some investigators have suggested that interventions designed to alter dialysis patients' perceptions of having little control over their condition may be successful in improving patient compliance (Hartman and Becker, 1978; Wenerowicz, Riskind, and Jenkins, 1978; Bollin and Hart, 1982).

Interestingly, hypnosis has been found to be effective in both

altering locus of control and improving compliance to weight-gain measures among a general population of hemodialysis patients (Morrill, 1978). Some investigators have reported on the use of hypnosis with dialysis patients, in which hypnosis effectively reduced patients' anxiety and helped facilitate their adjustment to the medical regimen (Dy and Fabri, 1972; Dimond, 1981). Other relevant studies have found hypnosis useful in altering the locus of control among cancer patients (Newton, 1983) and in helping therapy patients attain an attitude of mastery (Gardner, 1976).

The present research employs a hypnosis treatment condition with a specifically noncompliant, externally-oriented population of hemodialysis patients. The group of patients receiving hypnosis will be contrasted with a behavioral, "coaching" treatment condition, and with a no treatment control group, to compare the effectiveness of the hypnotherapy and coaching in improving medical compliance, altering locus of control, and reducing anxiety among the dialysis patients. This experimental study will also investigate the relationships among certain demographic variables--age, sex, educational level, socioeconomic status, and length of time as a dialysis patient--and patient adherence to the dialysis regimen.

Need for the Study

Despite the life-threatening nature of hemodialysis noncompliance, and the opportunities available in dialysis centers for objective, physiological measurement of compliance change, research to date in the area of interventions designed to improve dialysis compliance has been quite limited (Katz, 1974; Barnes, 1976; Magrab

and Papadopoulou, 1977; Morrill, 1978; Hart, 1979; Wenerowicz, 1980; Cummings, Becker, Kirscht, and Levin, 1981; Keane, Prue, and Collins, 1981). Moreover, among the few reported studies, only two have employed control groups for adequate comparisons of treatment effectiveness (Morrill, 1978; Cummings, Becker, Kirscht, and Levin, 1981). The present experimental research examines two treatment conditions which are designed to increase patient adherence. This study provides for comparisons among three treatment groups--two coaching groups and a hypnotherapy group--and it also includes a no treatment control group. In addition, this research allows for comparisons among compliant and noncompliant patients, and for contrasts between internally- and externally-oriented patients.

While some case studies have reported on the effective use of hypnosis with individual dialysis patients, only one controlled study thus far has systematically addressed the effectiveness of hypnosis in improving the compliance of dialysis patients (Morrill, 1978). In order to secure support for Morrill's claim that hypnosis can be effective in improving patients' compliance, further investigations of the use of hypnosis with noncompliant patients should be performed.

As mentioned, the relationship between dialysis patients' locus of control and their medical compliance has received attention in the professional literature. Investigators report that patients who are more internally-oriented believe they can control their difficult medical regimen, and are more likely to adhere to it. Research suggests that dialysis patients in general are an externally-oriented population (Poll and Kaplan-DeNour, 1980) and that their loss of

kidney function and subsequent machine dependency contributes to that orientation. While external locus of control is often discussed as related to dialysis noncompliance, only Morrill's (1978) research has employed measurement of locus of control in an intervention study. The present study further examines the relationship between locus of control and compliance and investigates the capacity of the various treatments to alter patients' measured locus of control expectancies.

Purpose of the Study

The purpose of this study, then, is to investigate the effectiveness of two treatments--hypnotherapy and behavioral "coaching"--in improving the medical compliance of hemodialysis patients. The study will also examine the effectiveness of the treatments in altering patients' locus of control and/or in reducing their level of anxiety. In addition, this research will examine the relationships among certain demographic variables--age, sex, educational level, and length of time on dialysis--and patients' compliance with the medical regimen of hemodialysis.

Hypotheses

The investigator makes the following hypotheses regarding the results of the research:

1. Subjects receiving hypnotherapy will evidence greater improvement in compliance than all other groups.

2. Both coaching groups will show greater improvement in compliance than the no treatment control group, the compliant subjects, and the internal subjects.

3. Subjects receiving hypnotherapy will show greater change in

locus of control than all other groups, and the change will be in an internal direction.

4. Hypnotherapy subjects will demonstrate greater reduction in anxiety than all other groups.

Definition of Terms

Anxiety: is operationally defined in this study by a patient's score on Bendig's (1956) Short Form of the Manifest Anxiety Scale. The scale is described in detail in the third chapter of this study.

BUN: blood urea nitrogen which refers to the level of urea in the blood.

Coaching: one of the two modes of treatment which were provided to dialysis patients in this study. Patients receiving this treatment were given information regarding their diet and the relationship between compliance and their health. They were also encouraged, or coached, to keep trying to adhere to their medical regimen. This treatment is described in greater detail in Chapter III of this study, and in Appendix B.

Compliance and Noncompliance: are operationally defined by a patient's score on an augmented version of the Kaplan-DeNour and Czaczkes' (1972) scale which measures compliance using objective medical chart information regarding patients' weight gain, serum potassium level, and BUN level. Patients receiving a score of 3 or below are judged compliant. Those scoring 4 or above are judged noncompliant. The scale, and its modification by the investigator, are described in detail in Chapter III, and are provided in Appendix A.

Externals: patients who exhibit an external locus of control expectancy. In this study, they are operationally defined as persons obtaining a score on Rotter's (1966) Internal-External Scale of 9 or above.

Hypnotherapy: one of two modes of treatment offered to patients in this study. Patients receiving hypnotherapy were aided by the investigator to enter hypnotic trance, and they were given suggestions designed to help them relax and experience greater control over the medical regimen. This treatment is described in the third chapter of this study, and a detailed description is located in Appendix B.

Hypnotizability: is operationally defined by a subject's score on a modified version of Morgan and Hilgard's (1978) Stanford Hypnotic Clinical Scale for Adults which measures hypnotizability on a five point scale. This scale can be found in Appendix A.

Internals: patients exhibiting an internal locus of control expectancy. In this study, they are operationally defined as persons obtaining a score on Rotter's (1966) Internal-External Scale of 8 or below.

Locus of control: is operationally defined by a patient's score on Rotter's (1966) Internal-External Scale.

No treatment controls: patients who are noncompliant and external but who did not receive one of the two modes of treatment during this study.

Weight-gain: is amount of weight which a patient gains between dialyses. Patients are weighed before and after each dialysis treatment. Weight-gain refers to the difference between their last

postdialysis weight and their next predialysis weight. The changes in a patient's weight are due predominantly to fluid consumption (Gutch and Stoner, 1975).

Limitations of the Study

The subjects in this study were almost entirely (91%) Black dialysis patients with very low socioeconomic status. The homogeneity of the sample prohibits the generalizability of the results of the study to more heterogeneous dialysis populations. The subjects were also volunteers. While only 8% of the total population of patients (129) at the dialysis center chose not to participate, the volunteer status of the subjects nonetheless means that the study does not involve a random sample. This limits the generalizability of the results of the study. The selection process also involved a purposive sample of patients who were both noncompliant with their regimen and exhibited an external locus of control, as measured on Rotter's scale. This select sample further limits the generalizability of the results to similar populations.

Finally, the instruments used to measure anxiety and locus of control are self-reports. The limitation of such instruments in general is that they may not accurately measure subjects' real feelings and perceptions. The particular limitations of psychometric instruments with dialysis populations have been cited by investigators (Yanagida and Streltzer, 1979) who point out that the high levels of denial and dependency among dialysis patients make such instruments subject to inaccuracy.

Organization of the Study

This study is organized into five chapters. The first chapter introduces the research problem and states the need for the study, purpose of the study, the hypotheses, definitions of terms, and limitations of the study. The second chapter reviews the literature pertaining to hemodialysis compliance, factors associated with noncompliance, locus of control and noncompliance, and strategies designed to improve dialysis compliance, including hypnosis. Chapter III provides the methodology of the research. It states the dependent and independent variables, explains the selection of subjects, the instrumentation, the treatment conditions, the procedures for data collection, the null hypotheses to be tested, and proposed methods for data analysis. The fourth chapter provides the data analysis in terms of the study's hypotheses. The fifth chapter discusses the implications of the results of the study and offers recommendations for future research.

CHAPTER II

REVIEW OF THE PROFESSIONAL LITERATURE

Introduction

Only two decades ago, nearly all persons who developed end-stage renal disease (ESRD) died. The creation of the artificial kidney and subsequent passage of Medicare legislation in 1972 making dialysis treatment available to all ESRD patients regardless of age or financial condition opened a new era in medical science (Levy, 1981a). Presently, the preponderance of ESRD patients can be kept alive indefinitely through some form of kidney dialysis, and many can hope for eventual kidney transplantation. In effect, a new population has been created by the availability of long-term survival on dialysis. However, persons kept alive by kidney machines are different from normal persons due to the nature and demands of their treatment (Levy, 1981a). They are continually faced with the decision of whether, or how much, to cooperate with a very demanding lifestyle upon which their survival depends.

The following literature review examines the issue of hemodialysis patients' adherence and nonadherence to their therapeutic regimen. The review begins with a discussion of some conceptual and methodologic problems encountered in the compliance literature. Next, the magnitude or incidence of patient noncompliance will be examined. An analysis of the factors associated with noncompliance will follow,

and finally, treatment interventions designed to improve hemodialysis compliance will be discussed.

Definitional and Methodologic Problems

A major difficulty in any discussion of adherence to therapeutic regimens is defining what is meant by "adherence" or "compliance" (Epstein and Cluss, 1982). The chief spokesmen for the systematic study of compliance in health care, R. Brian Haynes and his associates (Sackett and Haynes, 1976; Haynes, Taylor, and Sackett, 1979), define compliance as "the extent to which a person's behavior (in terms of taking medications, following diets, or executing lifestyle changes) coincides with medical or health advice" (Haynes, Taylor, and Sackett, 1979, p. 23). While this loose interpretation of "compliance" is appropriate as a general definition, greater precision is needed when analyzing a specific condition.

Investigators reviewing the compliance literature (Davis, 1966; Marston, 1970; Sackett and Haynes, 1976; Haynes, Taylor, and Sackett, 1979) point out that adherence to therapeutic regimens is defined, measured, and reported in a variety of ways not only from one medical condition to another, but also within conditions. For example, there are three general methods for obtaining compliance data (Marston, 1970; Gordis, 1979): direct, indirect and combined methods. Direct methods are blood and urine analyses; indirect methods include patients' self-report, physicians' impressions, pill and bottle counts, etc.; a combined method might include both patient interviews and blood analyses. Confusion and problems of interpretation can result when compliance studies employing different method of

assessment are compared. For example, differences reported in the rate of compliance among dialysis studies using different methods of assessment might simply reflect the methodological disparity among the studies, and not actually show differences in patients' behavior.

As a way out of the conceptual and methodologic confusion in the compliance literature, Epstein and Cluss (1982) encouraged investigators to identify the precise operational definitions of adherence used in any given study. In this review, care has been taken to be compliant with these recommendations. Whenever possible, the operational definitions and methods employed in the various studies will be identified and discussed.

Assessment and Magnitude of Hemodialysis Noncompliance

Insufficient attention in the professional literature has been given to the incidence of noncompliance among chronic hemodialysis patients (Binik, 1983). When the magnitude of noncompliance is addressed, the methodologic inconsistencies discussed above contribute to a rather obscure picture.

Sackett and Snow (1979), writing a chapter on the magnitude of compliance and noncompliance across health conditions in Compliance in Health Care (Haynes, Taylor, and Sackett, 1979), reviewed 537 reports (extant in 1977) regarding therapeutic adherence. Applying rigorous methodologic rules for attention to sample selection (only studies with 50+ patients accepted) and sample specification, they found only 33 reports which met their strict criteria. Two of the 33 (Kaplan-DeNour and Czaczkes, 1976; Borkman, 1976) concerned hemodialysis patients. Ironically, with all their attention to

methodologic rigor, the authors erred in reporting the rate of compliance in one of the studies. As reported by Sackett and Snow, the two studies provide very different pictures of the incidence of noncompliance: Kaplan-DeNour and Czaczkes show only 23% compliance, while Borkman reports 70% patient compliance. However, Sackett and Snow misinterpreted the Kaplan-DeNour and Czaczkes report. The actual rate of compliance provided by the authors was 61%. Only 23% of the patients in the study demonstrated "good" adherence to the regimen, but 61% were "fair" or better, qualifying as compliant. This example illustrates the difficulties encountered in attempting to discern the magnitude of hemodialysis noncompliance from the professional literature.

Table 1 summarizes 15 hemodialysis adherence studies providing information regarding the incidence of noncompliance. Careful attention should be given to the range of operational definitions presented. Note that nine of the 11 studies employ direct methods of defining and measuring compliance: interdialysis weight-gains and blood analyses; two studies use the less reliable, indirect method of staff estimates; and one study (Bollin and Hart, 1982) employs a combined method of patient interviews and blood and weight analyses.

Of the 15 studies listed, ten provide an index of the overall rate of compliance. No study reports overall patient compliance greater than 75% or less than 31%. The two studies using staff estimates of patient adherence as their operational definitions report the highest rates of compliance: 75% (Lee, Patel, Bluestone, and Kaufman, 1978) and 70% (Borkman, 1976). Leon Gordis (1976), writing

Table 1

Studies Providing a Measurement of the Rate of Compliance Among Hemodialysis Patients

Study	Sample	Measure	Definition	Compliance
1. Kaplan-DeNour & Czaczkes (1972)	43 patients from 6 dialysis units in Israel	Measures of weight-gains, and blood chemistries	Weight gain less than 1.5 kg (3.3 lbs), and K less than 6.5 mEq./L	53%
2. Winokur et al. (1973)	38 patients from 5 units in Israel	Measures of weight-gains, and blood chemistries	Same as Kaplan-DeNour and Czaczkes, above	41%
3. Kaplan-DeNour & Czaczkes (1976)	136 patients from 6 dialysis units in Israel	Measures of weight-gains, and blood chemistries	Weight less than 1.5 kg., and K less than 6.5 mEq/L., and BUN less than mg%	61%
4. Borkman (1976)	661 patients in 93 U.S. dialysis centers	Staff assessments	Staff rating of excellent or adequate adherence	70%
5. Blackburn (1977)	53 patients at a community hospital in Houston, Texas	Measures of weight, and blood chemistries	Weight and chemistries falling within acceptable limits 50% of the time: weight less than 4 lbs (1.81 kg.); phosphorus less than 50 mg/100 ml.: K 3.5 - 5.0 mEq/L.	Weight: 49% Ph: 62% K: 79%
6. Lee et al. (1978)	45 patients from kidney center in the Bronx	Staff estimates	Staff estimates of compliance	75%

Table 1 (continued)

Study	Sample	Measure	Definition	Compliance
7. Procci (1978)	31 patients at USC Medical Center	Measures of weight and potassium	Weight gain less than or equal to .9 kg (1.98 lbs); and K less than or equal to 5.5 mEq/L.	39%
8. Wenerowicz, Riskind, and Jenkins (1978)	19 patients in a Milwaukee Center	Measures of weight and blood chemistries	Weight less than or equal to 2.6 kg. (5.7 lbs); Ph. less than or equal to 4.5%; K less than or equal to 5.5 mEq/L.; BUN less than or equal to 100 mg.%	Weight: 53% Ph: 32% K: 74% BUN: 53%
9. Skoutakis, Acchiardo, Martinez, Lorisch, and Wood (1978)	24 patients at University of Tennessee Center for Health Sciences (Memphis)	Measures of weight, blood pressure, and blood chemistries	Weight gain less than 2.2 lbs; K less than 6.5 mEq/L.; BUN never above 95%; diastolic blood pressure never above 98 mm Hg.; Phosphorus never above 5.5%	33%
10. Poll and Kaplan-DeNour (1980)	40 patients in 4 units in Israel	Measures of weight and blood chemistries	Weight less than 1.5 kg. (3.3 lbs) and K less than 6.5 mEq/L.; BUN less than or equal to 100 mg.%	52%

Table 1 (continued)

Study	Sample	Measure	Definition	Compliance
11. Agashua, Lyle, Livesley, Slade, Winney, and Irwin (1981)	35 patients at a Center in Edinburgh, Scotland	Measures of weight	(a) Weight less than or equal to 1 kg. (2.2 lbs) (b) Weight less than or equal to 1.5 kg. (3.3 lbs)	31% 66%
	35 home dialysis patients in Scotland		(a) Weight less than or equal to 1 kg. (b) Weight less than or equal to 1.5 kg.	40% 69%
12. Cummings, Becker, Kirscht, and Levin (1981)	116 patients from 2 outpatient clinics in Southeastern Michigan	Measures of weight	Weight gain less than or equal to 3 kg. (6.6 lbs). K less than or equal to 5.5 mEq/L.	59%
13. Bollin and Hart (1982)	30 patients at Veteran's Hospital in Eastern Iowa	Weight and blood chemistries and recall of dietary habits	Compliance with weight and one other category: Weight gain less than 500 c.c. above patient's avg. weight; K less than 6.0 mEq/L. for at least 4 of 6 months; Recall (a) diet prescribed and appropriate behaviors; (b) Identify prohibited foods and reasons why.	50%

Table 1 (continued)

Study	Sample	Measure	Definition	Compliance
14. Cheek (1982)	27 patients in hospital-based unit in Louisiana	Measures of weight, and blood chemistries	Weight and chemistries falling within acceptable limits at least 50% of the time:	
			Weight gain less than 1.51 kg:	66%
			K between 3.0-5.0 mEq/L:	33%
			Ph. less than 4.5 mg.%	7%
15. Yanitski (1983)	29 incenter patients in Alberta, Canada	Measures of weight and blood chemistries	Measures falling within acceptable limits at least 50% of the time:	
			Weight less than .5 kg (within 24 hrs)	30%
			K less than 5.51 mMol/L	85%
			Ph. less than 1.61 mMol/L	65%

(Table adapted from Haynes et al., 1981)

on the methodological problems inherent in compliance research, reviewed the literature regarding physicians' ability to estimate their patients' adherence. He concluded that physician estimates are generally unreliable, that doctors tend to overestimate their patients' compliance. Borkman (1976) indicates that nurses made over 40% of the estimates of compliance in her study. Their assessments are perhaps less subject to bias than physicians' (Kaplan-DeNour and Czaczkes, 1971), possibly increasing the accuracy of Borkman's reported compliance rate.

Among the 13 studies employing direct or combined methods of assessing adherence, eight provide overall indices of compliance. The rates reported range from 33% to 69%. A crude average of the reported overall compliance rates among the eight studies is 46.1%.

Table 1 illustrates that interdialysis weight-gain is employed as an index of adherence to the fluid restrictions of the dialysis regimen in the 13 studies using direct or combined methods for measuring compliance. Weight-gain is also part of the frame of reference for staff estimates in the Borkman (1976) study, and most likely a criterion for staff estimates in the Lee et al. report. With no or extremely limited urine output, ESRD patients' fluid intake is severely restricted (Gutch and Stoner, 1975; Klenow, 1979; Cummings, Becker, Kirscht and Levin, 1982). ESRD patients seldom gain body weight, or "dry weight" (Gutch and Stoner, 1975), thus weight increases between dialyses represent an approximation of the patient's fluid intake. Investigators agree that the fluid restrictions are the most difficult part of the dialysis regimen for patients to follow

(Kaplan-DeNour and Czaczkes, 1972; Blackburn, 1977; Klenow, 1979); therefore, weight-gain compliance is usually the poorest among patient adherence behaviors. Table 1 shows six studies which provide independent compliance rates for weight-gain (Blackburn, 1977; Wenerowicz, Riskind, and Jenkins, 1978; Agashua, Lyle, Livesley, Slade, Winney, and Irwin, 1981; Cummings, Becker, Kirscht, and Levin, 1981; Cheek, 1982; Yanitski, 1983). The range of acceptable limits for fluid weight-gains among these studies is from 1 kg. (2.2 lbs) in the studies by Agashua et al. and Yanitski, to 3 kg. (6.6 lbs) in the report by Cummings and his associates. A crude averaging of the weight-gain compliance rates of the six studies yields a mean compliance rate of 51.4%.

A number of conclusions may be drawn from the literature regarding the magnitude of hemodialysis noncompliance. Excluding reports of staff estimates of patient adherence, it appears that approximately one-half of dialysis patients do not regularly adhere to some part of their therapeutic regimen. With the consequences of noncompliance ranging from discomfort and shortness of breath, to death from congestive heart failure or other complications, 50% noncompliance represents a serious threat to hemodialysis patients' successful adjustment and survival.

The fluid restrictions of the dialysis regimen are the most difficult part for patients (Kaplan-DeNour and Czaczkes, 1972; Blackburn, 1977; Klenow, 1979), and this fact is evidenced in the poor adherence to weight-gain limits reported in the studies reviewed. Studies which provide a singular compliance rate, rather than

reporting on each compliance criterion, are most likely reporting the rate of fluid compliance as the overall compliance rate. The present review found an average fluid compliance rate of approximately 51% among the studies.

Methodologic inconsistency characterizes the dialysis compliance research. The reports reviewed which employ direct or combined methods of assessing adherence are inconsistent in both the compliance criteria reported and in the acceptable limits of those criteria. While fluid weight-gains are reported universally, and most studies (twelve of fifteen) include serum potassium levels in their assessments, some studies (four of fifteen) also use BUN levels or serum phosphorus levels (five of fifteen) in assessing compliance. While the acceptable limits for potassium adherence is relatively stable among the reports reviewed, the range of acceptable interdialysis weight-gain limits varies substantially among the reports. Since overall compliance rates are frequently determined by fluid weight adherence, the inconsistency among the reports regarding acceptable fluid limits represents a significant flaw in the dialysis research.

One attempt at a formal compliance scale is found among the studies reviewed. Kaplan-DeNour and Czaczkes (1972) created a five point scale for hemodialysis adherence, which rates patients' behavior from excellent compliance to great abuse. The scale (which will be discussed further in Chapter III) was modified and used in two other reports by Kaplan-DeNour (Kaplan-Denour and Czaczkes, 1976; Poll and Kaplan-DeNour, 1980), and appears to have been used in a modified form

by Skotakis et al. (Skotakis, Acchiardo, Martinez, Lorisch, and Wood, 1978). The scale suffers from reporting only a composite compliance score; investigators reviewing reports in which the scale is used are thus unable to follow the individual compliance criteria. Nonetheless, the scale allows for quantification, and can be correlated with other compliance factors; and it represents the first serious attempt at consistency in the dialysis compliance research.

Demographic Factors and Features of the Regimen Associated with Hemodialysis Noncompliance

Demographic Variables

Reviewers of the medical compliance literature concur that demographic factors are generally poor predictors of patient adherence (Blackwell, 1973; Davis, 1966; Haynes, 1976; Marston, 1970). Age, sex, educational level, socioeconomic status, occupational status, marital status, race, and religion appear to have no consistent value as determinants of compliance. However, Mazur (1981), suggests that when viewed within the context of a specific disease, demographic variables may prove helpful in predicting patient noncompliance.

Investigations into the influence of demographic variables on hemodialysis adherence have been sparse. The trend in dialysis research is to cite the reviews of the general compliance literature, particularly Marston (1970) and Haynes (1976), which conclude that demographic variables are not helpful in understanding patient noncompliance. Sixteen dialysis compliance reports concerning the influence of demographics are reviewed below and are listed in Table 2.

Table 2

Summary of Findings Regarding Demographic Variables' Influence on Dialysis Compliance

Study	Age	Sex	Race	IQ	Marital Status	Education	Employment	SES/Income	L.T.D.
Winokur et al. (1973)				NS		+C			
Kaplan-DeNour and Czaczkes (1974)	NS	NS				+C			
Borkman (1976)	NS	NS	NS	NS	NS	-Pr.			
Kaplan-DeNour and Czaczkes (1976)									NS
Blackburn (1977)	NS	+K,F	NS		NS	-WG		NS	-K;-Ph
Hartman and Becker (1978)	+K +Ph	+Ph,M			+WG,m			NS	+WG +K +Ph
Procci (1978)	NS	NS	NS		NS	NS	+C	NS	NS
Poll and Kaplan-DeNour (1980)	NS	NS				NS			
Basta (1981)									-C
Kiriloff (1981)	NS	+C,F	NS		NS	NS			NS
Procci (1981)	NS	NS			-C,u	NS	NS	NS	NS
Yanagida et al. (1981)	NS	NS	NS		NS	NS			NS
Bollin and Hart (1982)	NS	NS			NS		NS		+C
Cheek (1982)	NS	NS			+C,m	NS			NS
Cummings et al. (1982)	+Ph +WG	+WG,F				NS		NS	-K
Yanitski (1983)	NS	NS			NS	+C		NS	NS

Table 2 (continued)

Key:

S.E.S. = socioeconomic status. L.T.D. = length of time on dialysis. + = positive correlation

- = negative correlation. NS = no significant relationship found. C = overall compliance.

WG = weight gain between dialysis. K = potassium compliance. Ph = phosphorus compliance.

Pr = protein compliance. M = males. F = females. M = married. U = unmarried.

Winokur, Czaczkes, and Kaplan-DeNour (1973) examined the relationship between compliance and intelligence with 38 patients from five hospitals in Israel. Using a direct method of assessment (see Table 1), they found no relationship between intelligence and compliance.

Kaplan-DeNour and Czaczkes (1974) analyzed the influence of sex, age, and educational level on the compliance of 83 out-patients in eight different hospitals in Israel. The investigators reported that most of the patients were of low socio-economic background with little education. Compliance was assessed "good", "fair", or "bad" using data obtained from the medical charts, and by physical examination (but it is not reported directly in the study). The investigators found educational level positively correlated with compliance, i.e., patients with higher education were more inclined to comply with the diet. Sex and age were unrelated to compliance.

Borkman (1976) examined sex, age, race, estimated intelligence, educational level, and marital status in relation to medical staff estimates of patients' compliance to shunt care and restrictions to fluid, salt, and protein intake. No information was provided regarding the criteria for estimates of "excellent", "adequate", or "poor" compliance made by the medical staff. Borkman reported that educational level was negatively associated with estimated protein compliance. College graduates had a higher percentage of "poor" compliers than the group with the least education (less than high school). Borkman commented that Marston (1970) found mixed and contradictory associations between educational level and adherence in

her review of the medical compliance literature. Borkman's finding, linking education with compliance is supported by Kaplan-DeNour and Czaczkes' (1974) study cited above, and by Winokur et al.

Kaplan-DeNour and Czaczkes (1976), while studying the influence of patients' personality on adjustment to dialysis, investigated the effects of time-as-a-patient on compliance to the regimen. Employing a direct method for assessing compliance (see Table 1), they compared the compliance of 51 patients at a two year follow-up, with their compliance at one year and six month follow-ups. The investigators found no change in compliance related to time. They reported no other correlations to demographic variables, though it is clear from their report that other variables (age, sex, educational level, socio-economic level) were studied.

Blackburn (1977) examined compliance and age, sex, marital status, and length of time as a dialysis patient, with 53 patients in a Houston, Texas community hospital. Employing objective measures of compliance (see Table 1), she found that sex, education, and length of time on dialysis had some influence on patient compliance. Women were more likely to comply with the potassium limits of the regimen than men. Patients with less education were more adherent to the fluid restrictions: compliant patients had completed an average 10.7 years of school, noncompliant patients 13.1 years. Length of time on dialysis was inversely related to potassium and phosphorus adherence. Potassium-compliant patients had been on dialysis for an average of 16.8 months, as opposed to 26 months for the noncompliers. Patients compliant with the phosphorus instructions of the regimen had been on

dialysis a mean 15.6 months, while those noncompliant 23.8 months. Blackburn's finding concerning duration of treatment's negative effect on compliance is consistent with the general compliance literature (Davis, 1968; Marston, 1970; Haynes, 1976) relating aspects of the regimen to adherence. This will be further discussed later in this review.

Hartman and Becker (1978) studied 50 patients from three outpatient units in Ohio. Their assessment of compliance was described in the following way:

> whether, across six observations, the patient was within the compliant range (as defined by the medical staff) more or less often or not (when the person was compliant and noncompliant an equal number of times, he or she was assigned to an intermediate category). This procedure allowed the investigators to rank-order all subjects into high, medium, and low adherence categories for each of the objective or "hard" measures of compliance (1978, p. 980).

The authors did not provide the compliant ranges of phosphorus, potassium, or weight gain which were defined by the medical staff in their study. Age, sex, marital status, income, and length of time on dialysis were examined for their relationships to compliance, and only income proved unrelated. Age was linked to phosphorus and potassium adherence, with older patients more compliant. Sex was related to phosphorus compliance, with males more likely to take their phosphorus-binding medication than females. A positive correlation was found between patients' being married and their adherence to the fluid restrictions, as seen in their interdialysis weight-gain. Length of time on dialysis was positively correlated with all aspects of compliance: phosphorus, potassium, and weight-gain.

Hartman and Becker's finding that men were more compliant than women with the phosphorus instructions of the regimen does not directly oppose Blackburn's (1977) discovery that women were more potassium compliant than men, but makes a consistent relationship between sex and adherence seem questionable. Hartman and Becker's finding that time on dialysis was positively associated with compliance is in direct conflict with Blackburn (1977), and is inconsistent with the medical compliance literature (Davis, 1968; Marston, 1970; Haynes, 1976).

In general, the absence of defined limits for the compliance criteria make Hartman and Becker's entire report less useful regarding the influence of demographics on compliance.

Procci (1978) studied 31 patients at the University of Southern California Medical Center. Age, sex, race, marital status, educational level, employment status, socioeconomic status, and length of time on dialysis were analyzed for their influence on adherence. Using a direct method for assessing compliance to the regimen (see Table 1), he found that only employment status was significantly related to compliance. "Individuals with full- or part-time employment, students, and women performing at least three-fourths of their own housework were considered employed" (Procci, 1978, p. 19). Using this liberal designation of employment, Procci found that 60% (nine of fifteen) of the employed patients adhered to the dietary restrictions, while only 19% (three of sixteen) of the unemployed were adherent. He concludes that "the ability to remain employed in the face of a very demanding and stressful situation and the ability to

adhere to a restrictive diet are related" (Procci, p. 23). The investigation employs only a composite compliance measure. While Procci commented on the differing rates of fluid and potassium compliance (45% and 84%, respectively), he only reported correlations between the demographic variables and overall compliance. Thus, it is possible that certain demographic variables may be linked to fluid or potassium compliance but are not reported.

In 1981, Procci published another report on these 31 patients (Procci, 1981), examining factors associated with severe abuse of the hemodialysis diet. Severe abuse was operationally defined as mean weight gain (for six months) of greater than 1.4 kg. (3.08 lbs.) or mean serum potassium greater than 6.0 mEq. per liter. Seven of the 31 patients were thus categorized as severe abusers of the diet. Procci examined age, sex, race, marital status, socioeconomic status, education, employment status, and time on dialysis for their relationships to severe abuse of the diet. Only marital status proved significantly related. Severe abusers were typically unmarried. This finding is supportive of Hartman and Becker (1978) who found weight-gain compliance better among married patients. Procci did not find that marital status differentiated compliant from noncompliant patients in his earlier study (1978); he found it related only to severe noncompliance.

Poll and Kaplan-DeNour (1980) studied 40 patients on four dialysis units in Israel. Compliance was assessed on a five-point scale, from excellent compliance to great abuse (see Table 1). Among the variables under examination were age, sex, educational level, and

length of time on dialysis. They found no significant relationships between patient adherence and any of these variables, but only a composite compliance measure was reported. No analysis of the relationships among the individual compliance criteria and the demographic variables was provided.

Basta (1981) included length of time on dialysis among the variables she studied in comparing compliant and noncompliant patients at seven dialysis centers in the mid-Atlantic United States. A purposive sample of 189 subjects was dichotomized as compliant or noncompliant by a direct method of assessment which included the presence or absence of predialysis respiratory distress and/or hypertension, and which assessed attendance. Compliant patients had interdialysis weight of 1.5 kg or less per 24-hour period, serum potassium levels between 3.5 and 5 mEq. per liter, and blood urea nitrogen (BUN) levels less than 100 mg. percent. Noncompliant patients gained 1.6 kg or more in 24 hours, had potassium levels of 6.5 mEq. per liter or more, and BUN's of 120 mg. percent or above. Basta found that length of time on dialysis was inversely related to compliance. Her finding is consistent with Blackburn (1977) and is supported by the greater medical compliance literature (Davis, 1968; Marston, 1970; Haynes, 1976). It is in conflict with Hartman and Becker's (1978) finding linking duration of treatment to compliance.

Kiriloff (1981) investigated factors influencing dialysis adherence among 60 patients from five outpatient centers near Pittsburgh, Pennsylvania. The method of assessing compliance (described, but not reported directly) involved obtaining patients'

average values for interdialysis weight-gains, serum potassium, serum creatinine, BUN, and predialysis diastolic blood pressure, and then ranking the values among the patients. Thirty patients with the lowest rank scores were deemed compliant and the other 30 noncompliant. Demographic variables examined by Kiriloff were sex, age, race, marital status, education, and length of time on dialysis. Only sex was found to be associated with compliance; Kiriloff reports that women were more often compliant than men.

Yanagida, Streltzer, and Siemsen (1981) examined fluid compliance and age, sex, race, marital status, religion, occupation, education, and time on dialysis, with 31 outpatients from a hospital-based program in Honolulu, Hawaii. The 31 patients were chosen from a patient population of 46, on the basis of their consistent compliance or noncompliance. Compliance was measured by a direct method: average fluid weight-gain of 2.5 kg. or more 50% of the time represented noncompliance, and weight-gain of 2.0 kg. or less 75% of the time represented compliance. The investigators found no relationships between compliance and any of the demographic variables.

Bollin and Hart (1982) studied 30 patients in a veteran's hospital in Eastern Iowa. Using a combined method of compliance assessment (see Table 1), they found that length of time on dialysis was positively correlated with overall compliance. The authors did not report the correlations between compliance and age, sex, marital status, or employment though these variables were examined. Nor did they report the correlations between length of time on dialysis and the individual compliance criteria, i.e., weight, potassium, etc. No

conclusions can be drawn, therefore, regarding the relationships among these variables and compliance.

Their finding that time on dialysis is positively related to overall compliance agrees with the results of Hartman and Becker (1978), but is opposed by the findings of Blackburn (1977), Basta (1981), and the general compliance literature (Davis, 1968; Marston, 1970; Haynes, 1976).

Cheek (1982) studied 27 patients in a hospital unit in Louisiana. Employing a direct method of assessment (see Table 1), she examined the relationship of compliance to age, sex, marital status, education, ethnicity, religion, and length of time on dialysis. Age and marital status correlated with compliance. Older patients and married patients were more compliant. Hartman and Becker (1978) also found age positively associated with compliance and found married patients more compliant than unmarried patients. Procci (1981) found unmarried patients more likely to be severe abusers of the diet than married patients.

Cummings and his associates (Cummings, Becker, Kirscht, and Levin, 1982) in a second study on data reported elsewhere (Cummings et al., 1981), examined the influence of age, sex, family income, educational level, and length of time receiving dialysis on patient adherence. Using a direct method for assessing compliance (see Cummings et al., 1981, in Table 1), the investigators studied 116 patients from two outpatient clinics in Southeastern Michigan. They found that age, sex, and length of time on dialysis each correlated

significantly with some aspect of patient compliance. Age correlated positively with phosphorus adherence and weight-gain compliance. Sex was also linked to weight gain, with females more compliant to the fluid restrictions than males. Length of time on dialysis was inversely related to potassium compliance: the longer on dialysis, the poorer the adherence to the potassium limits of the regimen.

The findings that fluid compliance was more likely among women than men represents the sole report in the literature linking fluid compliance to sex. It adds to the confusion regarding the influence of sex on patient adherence. It is tenuously consistent with Blackburn (1977) who found women more compliant with the potassium limits of the regimen, and in apparent conflict with Becker's other finding, with Hartman (Hartman and Becker, 1978), that men were more phosphorus-compliant than women. The inverse relationship found between duration of treatment and potassium compliance is in direct conflict with Hartman and Becker (1978) and is also opposed by Bollin and Hart's (1982) study. It is, however, consistent with Blackburn (1977), Basta (1981), and with the medical compliance literature. The discovery that age was positively correlated with phosphorus adherence is supported by Hartman and Becker's study and by Cheek (1982) who found older patients generally more compliant.

Yanitski (1983) studied 29 incenter patients at the University of Alberta Hospitals in Alberta, Canada. Using a direct method for assessing compliance (see Table 1), she examined compliance and age, sex, marital status, income, education, and length of time on dialysis. Education was found significantly related to compliance,

with more educated patients complying better. This finding supports Winokur et al. (1972) and Kaplan-DeNour and Czaczkes (1974), but is is opposed to the findings of Borkman (1976) and Blackburn (1977) who found educational level inversely related to compliance.

Table 2 summarizes the findings of the 16 reports reviewed above. Most striking is the lack of relationship among the various demographic factors and dialysis compliance. No variable emerges as consistently related to any aspect of compliance. Age, sex, education, and length of time on dialysis appeared in 12 studies or more. None of these variables showed a relationship to compliance in even 50% of the studies in which they were examined.

The only strong trend evident in Table 2 is for most variables in each study to evidence no relationship to compliance. The only exceptions are the study by Hartman and Becker, in which four variables correlated with compliance, and the Cummings et al. study which also reported correlations among four variables and compliance. However, the general finding of no relationship between demographics and adherence is consistent with the greater medical compliance literature which, as mentioned, finds demographic variables of no value in predicting or understanding patient adherence. Thus, the present review appears to concur with the findings of previous medical compliance research. Age, sex, education, and length of time on dialysis were examined again for their relationships to compliance in the present experimental research. The statistical analysis of these variables' associations to compliance can be found in Chapter IV of this study.

Features of the Regimen

Haynes (1979) in his exhaustive analysis of the determinants of compliance to therapeutic regimens, reports that various aspects of the prescribed regimen have a direct impact on compliance. Among those features cited by Haynes which effect compliance, two are germaine to hemodialysis compliance: duration of treatment and complexity of the regimen. Regarding the former, Haynes reports "duration of treatment has an unequivocal effect on compliance: adherence to treatment decreases with time" (Haynes, 1979, p. 59). Of 15 reports which he reviewed, 12 showed negative correlations to compliance and three reported no relationship. However, the only hemodialysis report among the 15 (Kaplan-DeNour and Czaczkes, 1976), showed no relationship between duration of treatment and compliance. Table 2 provides 13 reports which analyze duration of treatment's effect on dialysis compliance. The results are far from unequivocal. Two studies show a positive relationship to compliance, three evidence a negative relationship and eight show no relationship. These studies make clear that duration of treatment is unrelated to dialysis adherence.

Haynes (1979) and others (Davis, 1978; Marston, 1970; Blackwell, 1976) have also concluded that the complexity of the prescribed regimen has an important effect on adherence: the more complex the regimen, the less likely patients will adhere to it. The hemodialysis regimen is quite complex and requires substantial behavior change from dialysis patients. Three, four to six hour treatments a week at the dialysis center are only the beginning. Patients must also adhere to

a stringent diet which restricts sodium, potassium, protein, and, worst of all, fluid intake. In addition, patients are required to take nine to twelve large capsules of (horrible-tasting, constipating) phosphate-binding medications daily, and many must ingest vitamins, drugs to reduce blood pressure, and other medications (Anderson, Nelson, and Margie, 1973). It would appear that the complexity of the dialysis regimen contributes to the low level of compliance reported among dialysis patients. Moreover, this aspect of the dialysis regimen does not lend itself to modification since end stage renal disease makes the various behaviors necessary to assure health maintenance.

Psychological Factors Associated with Dialysis Noncompliance

Psychological investigators have been fascinated by the unique life situation and problems of dialysis patients, e.g. artifically-prolonged survival, machine dependency, drive frustration, etc., since the earliest years of viable dialysis treatment. Armstrong (1984) reported that since the early 1960's, about 3,000 articles, chapters, and books have been written on the psychological adjustment of dialysis patients.

Early reports in the literature focussed on the stresses which patients undergo and their psychological reactions to the treatment (Shea, Bogdan, Freeman, and Schreiner, 1965; Kemp, 1966; Wright, Sand, and Livingston, 1966; Beard, 1969; Short and Wilson, 1969; Kaplan-DeNour, Shaltiel, and Czaczkes, 1969). The difficulty with which patients adjust to dialysis led a number of investigators to suggest assessment of "good candidates" for dialysis treatment (Sand,

Livingston, and Wright, 1966; Abram, 1968; Glassman, 1970; Malmquist, Kapfstein, Frank, Picklesimer, Clements, Gimm, and Cromwell, 1972). However, the passage of medicare legislation in 1972 making dialysis treatment financially available to all ESRD patients ended the formal discussion of good and bad candidates for treatment. Rather, as understanding of the adjustment process to dialysis developed, reports were published on the stages of adaptation to dialysis treatment. Abram (1969) described four stages which he observed in patients' adjustment: "the uremic syndrome" during which the physical complications of renal failure are dominant, "the shift to physical equilibrium" characterized by patient euphoria, "convalescence - the return to living", during which patients become aware of the demands of chronic dialysis treatment, and "the struggle for normalcy", which represents the patient's long term rehabilitation. Similarly, Reichsman and Levy (1972) termed the stages of adaptation "the honeymoon," "disenchantment and discouragement," and "long term adaptation."

The burgeoning dialysis research eventually led to the publication of excellent literature reviews and books (Levy, 1974; Anderson, 1975; Armstrong, 1978; Milne, Golden, and Fibus, 1978; Blodgett, 1981; Levy, 1982) and has resulted in a specialized field of psychological investigation, psychonephrology (Levy, 1984). Currently, annual conferences, both national and international, bring together recent research regarding the psychological aspects of dialysis and kidney transplantation, and the field of psychonephrology continues to develop and mature.

The issue of patients' adherence to the dialysis regimen appeared in some of the earliest dialysis research (Gombos, Lee, Harton, and Cummings, 1964; Shea, Bogdan, Freeman, and Schreiner, 1965; Retan and Lewis, 1965; Pendras and Erickson, 1966; Abram, 1968; Meldrum, Wolfram, and Rubini, 1968) where noncompliance was identified as a life-threatening problem for patients and a cogent indicator of their level of adjustment to the treatment. However, despite early interest in the problem of noncompliance, formal investigations into the psychological factors associated with it have been sparse. The literature is typified rather by anecdotal reports providing investigators' opinions of the factors related to patient nonadherence.

A review of the reports addressing the psychological aspects of dialysis noncompliance is presented here. Studies will be analyzed under five general categories: the dependency-independency conflict, depression, low frustration tolerance, the management of anxiety through denial and external locus of control, and the Health Belief Model.

The Dependency-Independency Conflict

Harry S. Abram, one of the seminal theorists on the psychological adaptation to hemodialysis, described (1968, 1969, 1974) the fierce dependency-independency conflict which faces the dialysis patient. He stated that the patient is required

> to remain dependent on a machine (the dialyzer) and the dialysis program for the rest of his life, and at the same time lead an independent life, assuming the responsibilities of a healthy person... This problem is compounded if the patient does not feel healthy... (1974, p. 51).

Abram explained that this dependency-independency conflict represents a double-bind for the patient, often resulting in some form of noncooperation. He maintained that if the patient is ambivalent in the areas of independency-dependency or activity-passivity, he/she will probably respond to the double bind by

> becoming excessively dependent and therefore "uncooperative" in the sense that he will not assume the responsibilities of living. Or he reacts in the opposite fashion by becoming excessively independent, rebelliously refusing to accept the restrictions of the program, and thus exhibiting another form of uncooperativeness (Ibid, p. 51).

Abram and other investigators have interpreted patient noncompliance in light of this dialysis double bind. In 1968, Abram provided a case study of a patient whose struggle in this area caused temporary dietary noncompliance and general negativism toward the medical staff. Compliance improved when the patient went back to his job as an electrician, a move toward resolving his dependency conflict. Kaplan-DeNour and Czaczkes (1972), in what was the first formal investigation of factors associated with noncompliance, studied 43 chronic patients in Israel. Carrying out formal psychiatric examinations of all patients, and employing a direct method of compliance assessment (see Table 1), they found a number of factors strongly related to noncompliance. Primary gain from the sick role was very common among abusers of the regimen. The authors discuss primary gain in the following way: There are ... patients for whom dialysis is a solution for a long-standing conflict, often in the area of dependency-independency or activity-passivity (1974, p. 340). When being ill has the power to solve psychological conflicts and reduce

anxiety, patients may act to ensure the continuance of illness by steady abuse of the medical regimen. Kaplan-DeNour and Czaczkes reported that "acting out", i.e., behavior which expresses unconscious emotions while allowing the patient to remain unconscious of his/her motivation, was prominent among both compliant and noncompliant patients, though more frequently observed among abusers of the regimen. The authors differentiated acting out hostility and aggression from acting out independence problems. The latter was not as frequently observed, but tended to be a cause of chronic noncompliance. The investigators maintained that the acting out of aggression (which will be discussed further below) also stems from the dependency-independency conflict. They believe that the high levels of aggression observed among dialysands is a consequence of their prolonged, marked dependency on the machine, the medical staff, and the regimen.

Lee and his associates (Lee, Patel, Bluestone, and Kaufman, 1978) studied 45 patients in the South Bronx. Employing the Current and Past Psychopathology Scale, a 172 item instrument designed to evaluate 26 psychiatric factors, and using a method of compliance assessment which combined staff estimates of noncompliance (25%) and standard deviations of weight gains, the investigators identified five factors which were associated with noncompliance: anxiety/depression on the current and past scale; anger/excitability, poor impulse control, and dependence on the past scale. The investigators discussed their findings in light of the Kaplan-DeNour and Czaczkes (1972) study, above. Regarding dependence (the other factors will be discussed

below), Lee and his colleagues interpret the primary gain from the sick role, identified by Kaplan-DeNour and Czaczkes, as a fulfillment of patients' desire for dependence.

Procci (1981) studied 31 patients at UCLA Medical Center. He identified seven of the patients as severe and persistent abusers of the diet. From his observation of the severely noncompliant patients, he concluded that extreme and persistent noncompliance results, in part, from the combination of unresolved dependency conflict and a dependency-provoking treatment regimen. He asserted that the dependency conflicts are critical to compliance due to the strong dependent relationship which is inherent to dialysis treatment. Consistent with Kaplan-DeNour and Czaczkes' finding regarding primary gain from the sick role, Procci postulated that patients who have historically experienced difficulty resolving their dependency issues may find adherence to the regimen too threatening: for severe dietary abusers, the degree of independence needed to control dietary behaviors may be intolerable since it carries the threat of loss of dependent need fulfillment (1981, p. 117).

Blodgett (1981), in his review of adjustment to hemodialysis, characterized noncompliance as an expression of the dependency-independency conflict, and argued against the psychopathological model often used to explain patients' food and fluid binging. Blodgett maintained that noncompliance can best be understood as a patient's attempt at autonomy. The tragic irony, he stated, is that the patient's expressions of autonomy alienate medical personnel and family members, thereby excluding the creation of an

alliance which could ultimately aid the patient in resolving his/her conflict.

Levy (1984) seems to concur with the earlier reports that patients' need for independence can result in noncompliance. In an article explaining the psychological complications of dialysis, he asserted that independent patients may be abusive of the regimen because compliance runs counter to their independency needs. Patients may respond with massive denial to protect themselves from the seriousness of their illness, Levy reported, and the use of massive denial can result in patients' failing to adhere to the diet, take the medicines, or even show up for the dialysis runs.

The patient's need to manage his/her aggression has already been introduced. The marked dependency of dialysis treatment results in high levels of aggression (Kaplan-DeNour and Czaczkes, 1968; 1972) which may find expression through displacement onto medical personnel and family members. Frequently, this takes the form of binge eating and drinking. In one of the earliest reports on dialysis adjustment, Shea and his associates (Shea, Bogdan, Freeman, and Schreiner, 1965) found severe psychiatric complications and/or noncompliance among eight of the nine patients they observed. The investigators commented that the noncompliance served as a means for patients to ventilate their displeasure regarding their restricted conditions. They stated that the patient's emotional reaction to the dependency of chronic dialysis "may represent the greatest obstacle to successful rehabilitation" (1965, p. 562).

In an anecdotal report describing inpatients in England,

Crammond, Knight, and Lawrence (1967) described how patients used the diet aggressively to displace hostility and anger onto the medical staff. The investigators interpreted loud criticism of hospital food, refusal of meals, and noncompliance with the fluid and dietary restrictions as the patients' way of "expressing their dislike of the whole situation which the food symbolizes" (1967, p. 1207).

As mentioned above, Kaplan-DeNour and Czaczkes (1972) and Lee and associates (1978) found evidence in empirical studies of a relationship between patients' anger and noncompliance. The former study identified acting out of hostility through episodic noncompliance among both adherent and nonadherent patients. They postulated that the patients' dependence on medical personnel for their survival precludes open expression of hostility, "as it is quite difficult to be aggressive to those on whom one's life depends..." (1972, p. 342); thus, hostility is expressed through noncompliance. Lee et al. (1978) believe that the hostile acting out cited by Kaplan-DeNour and Czaczkes is an expression of the anger, hostility, and aggression which they identified among noncompliant patients in their research.

The independency-dependency conflict is among the greatest obstacles to psychological adjustment to dialysis treatment (Blodgett, 1981). It appears from the reports reviewed above that patients' struggles with this issue can result in noncompliance for a variety of reasons. For independent patients, lack of adherence can be an expression of independence. For extremely dependent patients, adherence may be too threatening because it requires a level of

independence previously unattained. And for many patients, the regimen represents an arena for episodic expressions of anger and hostility caused by the forced dependency of chronic treatment.

Depression

Depression is the most common psychiatric complication of hemodialysis (Reichsman and Levy, 1972; Foster, Cohn, and McKegney, 1973; Kaplan-DeNour and Czaczkes, 1976; Levy, 1981). Renal failure and chronic dialysis mean multiple, severe losses for the patient, e.g., health, employment, income, social status, body image, sexual and reproductive capacity, physical stamina. Depression is easily understood as a consequence of such experiences (Wright, Sand, and Livingston, 1966; Stewart, 1983), and it can also result from the introjection of aggression related to patient dependency (Kaplan-DeNour and Czaczkes, 1972).

A number of investigators have examined the influence of depression on patients' adherence. An early report by Retan and Lewis (1965) viewed poor compliance as symptomatic of patient depression. The authors reported that five of the eight patients under their care "expressed thoughts of suicide and other symptoms of depression or they cooperated poorly in shunt care and dietary programs" (1965, p. 286).

In a frequently-cited report, Abram and associates (Abram, Moore, and Westervelt, 1971) sent questionnaires to over 200 dialysis centers in the United States, to investigate the prevalance of suicidal behavior among dialysis patients. One hundred twenty-seven questionnaires were completed, representing nearly 3,500 patients.

The investigators found a suicide incidence among dialysis patients four hundred times that of the normal population with the preponderance of suicides (117 of 159) resulting from noncompliance with the regimen. Abram and his colleagues discussed the suicidal noncompliance as a rational choice by patients, i.e., death as a solution to a miserable existence.

In a 1976 empirical report, Kaplan-DeNour and Czaczkes examined the influence of personality on the adjustment of 136 patients in Israel. Adjustment was conceptualized as consisting of compliance, rehabilitation, and psychological conditions as reflected by the presence or absence of four psychiatric complications: depression, suicidal tendencies, anxiety, and psychotic symptomology. The investigators found that severe depression (as differentiated from "moderate" and "no" depression) significantly decreased compliance. Kaplan-DeNour and Czaczkes interpret depression's effect on compliance as "indirect evidence that some of the dietary abuse is of suicidal character" (1976, p. 330).

In a study of suicide among dialysis patients in Switzerland and Europe, Haenel and associates (Haenel, Brunner, and Battegay, 1980) reported a suicide rate twenty-five times that of the normal population. Among the ten patients who committed suicide in Switzerland between 1965 and 1978, four died from noncompliance. These figures are alarmingly high, but are much lower than those reported by Abram et al. (1971). The investigators concluded that one "obvious reason" for the high rate of suicide is the impaired quality of life of the patients, and they cited the pervasive depression

reported by Reichsman and Levy (1972) as evidence of patients' misery. They also pointed out that dialysis patients have the means for successful suicide through noncompliance with different aspects of the regimen. This concurs with Levy (1981a) who stated that like policemen and physicians, dialysis patients "have ready access to the methods of death" (Levy, 1981a, p. 357).

As mentioned earlier, Lee et al. (1981) also found depression among factors associated with noncompliance. They concluded that persistent abusers would be likely to exhibit chronic anxiety or depression. Their study was designed to identify reliable criteria for predicting likely abusers of the regimen, and was not intended to provide dynamic understanding of noncompliant behavior. Their suggestion that chronic anxiety and depression would characterize abusers of the regimen seems overly presumptive from a correlational study, and indeed, one which employs a weak method for defining compliance. In fact, their interpretation regarding the chronic presence of depression or anxiety among abusers of the regimen is the only such conclusion found in the literature. A more likely interpretation of their finding is that high levels of anxiety or depression may result in patients' coping through noncompliant behavior.

Low Frustration Tolerance

It is clear that life on maintenance hemodialysis involves severe deprivation for many patients. Beyond renal failure and its concomitant losses, the patient is forced to conform to an austere regimen which carries a large number of restrictions. Some of life's

most basic needs are affected by these restrictions, most notably patients' eating and drinking habits. In light of the difficulty which this represents for patients, it is not surprising that frustration tolerance has been found related to patients' ability to adhere to the treatment regimen.

In a very early report on adjustment to dialysis, Gombos and his colleagues (Gombos, Lee, Harton, and Cummings, 1964) found that two of their four patients did poorly due to noncompliance. One of the two patients exhibited a diminished capacity to tolerate the continuous demands of chronic treatment. The investigators explained that "he just got tired of the medical regimen" (p. 467), and became severely noncompliant.

In their seminal study of psychological factors associated with noncompliance, Kaplan-DeNour and Czaczkes (1972) found that low frustration tolerance was the most frequent cause for noncompliance, present in 17 of 20 abusers of the diet, while in only eight of 23 compliant patients. The authors also mention that this factor was intractable to therapeutic intervention. They reported no success in modifying frustration tolerance through supportive or psychodynamic psychotherapy, group therapy, or even "pleas and threats" (p. 342). The authors concluded by suggesting that perhaps hypnosis could prove effective with this problem.

In their study already cited, Lee et al. (1978) identified poor impulse control as one of the factors predictive of noncompliance. They stated their belief that the low frustration tolerance reported by Kaplan-DeNour and Czaczkes (1972) is "directly related to the poor

impulse control" (Lee et al., p. 1241). The authors see both factors indicative of characterological problems which make tolerance of a very austere regimen unlikely.

Procci (1978) worked with 31 patients at UCLA Medical Center, and reported on the relationships among various demographic and psychosocial factors and compliance (see Tables 1 and 2). He learned that among patients who were not vocationally active, 81% were poor compliers. He stated that the capacity to remain employed while on chronic dialysis and the ability to adhere to the restrictive diet are related. He interpreted both of these behaviors as indicative of high frustration tolerance, and concurred with Kaplan-DeNour and Czaczkes (1972) that low frustration tolerance is predictive of poor compliance.

The Management of Anxiety Through Denial and External Locus of Control

Coping with the overwhelming stresses which artificially-prolonged survival and chronic illness entail is a critical psychological task for the hemodialysis patient. He/she must fend off the ever-present threat of death (Binik, 1983), and learn to cope with the nearly-as-intolerable fear of living as a dependent, handicapped person (Beard, 1969). The anxiety resulting from renal failure and chronic dialysis takes its toll on patients' emotional well being. Armstrong (1978, 1984), reviewing the literature on psychiatric complications of dialysis, reported that while the rate of psychiatric hospitalizations is not high among dialysis populations (McKegney, 1981), the mean incidence of emotional maladjustment is about 50%,

placing the rate of psychiatric symptomology among dialysis patients three to five times that of the general population.

To manage the anxiety which accompanies their condition, patients use defense mechanisms such as denial, repression, displacement, isolation of affect, reaction formation, and projection (Wright, Sand, and Livingston, 1966; Kaplan-DeNour, Shaltiel, and Czaczkes, 1968; Short and Wilson, 1969). Some patients adopt an external locus of control orientation which makes them feel less responsible for their health and behavior (Rotter, 1966; Goldstein and Reznikoff, 1971).

However, research in dialysis adherence has revealed that the defensive management of anxiety may represent another double bind or even triple bind for patients. When anxiety is responded to by massive denial or when patients' externality relieves them of responsibility for maintenance of their health, noncompliance is often the result (Goldstein and Fenster, 1973; Levy, 1984). On the other hand, less defensiveness by patients means greater suffering from anxiety; and high levels of anxiety has also been linked to poor compliance (Lee, Patel, Bluestone, and Kaufman, 1978; Parker, 1981; Kaplan-DeNour, 1982; Cheek, 1982). The research which examines the influence of anxiety, denial, and locus of control on dialysis compliance is presented here.

In their research already cited, Gombos and associates (Gombos, Lee, Harton, and Cummings, 1964) reported that two of their four patients did poorly due to noncompliance. They described the noncompliant behavior of one patient as the results of his attempt to manage heightened anxiety through repression and denial thereby

putting the need for compliance out of awareness.

Sand and her associates (Sand, Wright, and Livingston, 1966) identified "excessive" denial as one of the factors which they found useful in predicting future noncompliers.

Cummings (1970), in an anecdotal report, explained that the distortion of information regarding their diet, which many patients exhibit due to denial, could lead to noncompliance and even death.

In an empirical study, Glassman and Siegel (1970) evaluated seven patients at Michael Reese Hospital in Chicago, using personality inventories and subjective observation. The investigators were "struck by the remarkable disparity" between the test data which showed low levels of anxiety and depression, and the clinical appearance of the patients who seemed quite depressed. Glassman and Siegel attributed the disparity to "massive use of denial" (p. 569). The authors also attributed eating binges "tantamount to suicide" (p. 567) to patients' extreme denial of their distress.

In the first formal investigation of the effects of denial on patients' compliance, Yanagida and her colleagues (Yanagida, Streltzer, and Siemsen, 1981) studied 31 chronic patients in Hawaii who were selected from a sample of 46 patients on the basis of their consistent compliance or noncompliance. Compliance was defined as weight gains between dialysis of two kilograms or less 75% of the time, across 75 observations. Noncompliance was defined as weight gains of two and a half kilograms or more, 50% of the time. The Marlowe-Crowne Social Desirability Scale (MCSDS) was used as a means of evaluating denial. The investigators found denial prominent in all

patients, but were not able to differentiate compliers from abusers on the basis of their denial scores.

In an anecdotal report, Levy (1984) stated that patients' use of denial to protect themselves against the seriousness of their illness can result in noncompliance. He suggested that denial "cannot be used much" (p. 240) if patients are to comply. However, in his experience, "the need for a respite from the illness ... often encourages a wide use of denial causing many patients to ignore the diet..." (p. 240).

It should be noted that Kaplan-DeNour and Czaczkes (1972) did not find "denial of the sick role" a common factor among patients, in their study of factors influencing compliance. It was observed among only 10 of 43 patients. It would appear that this factor is different in quality than the more general mechanism of denial per se, and that the specificity of "denial of the sick role" explains its lowest incidence among the patients.

To conclude, denial is the most widely used defense mechanism against the anxiety inherent to renal failure and chronic dialysis (Short and Wilson, 1969). The ubiquity of denial suggests its adaptive function in shielding patients from overwhelming anxiety, and allowing them to cope with the realities of chronic illness. While some denial appears necessary for adaptation to dialysis (Halper, 1971; Stewart, 1983), massive denial may result in noncompliance or even death (Levy, 1984). The only empirical study of denial's affect on compliance (Yanagida et al,, 1981) reported that while denial was evident in all patients, it did not differentiate compliers from abusers.

The relationship between dialysis patients' locus of control expectancies (Rotter, 1966) and their adherence to the medical regimen has been considered by several investigators (Goldstein and Reznikoff, 1971; Weaver, 1972; Kilpatrick, Miller, and Williams, 1972; Blackburn, 1977; Wenerowicz, Riskind, and Jenkins, 1978; Hartman and Becker, 1978; Viederman, 1974, 1978; Poll and Kaplan-DeNour, 1980; Bollin and Hart, 1982; Yanitski, 1983; Prater, 1985). The preponderance of research suggests that when patients see themselves as having little control over their health or health behaviors, they are less likely to comply with the demands of the regimen.

In their seminal research on locus of control and compliance, Goldstein and Reznikoff took issue with the findings of Abram and his associates (Abram, Moore, and Westervelt, 1971) regarding the suicidal intent of noncompliant patients. Rather than interpret patients' noncompliance as suicidal, Goldstein and Reznikoff suggested that such behavior be viewed as an attempt by patients to adjust to the psychological stress of their illness. They postulated that patients adopt an external locus of control to defend against the anxiety inherent to their illness and treatment. They compared 22 male hemodialysis patients with 24 male controls in the convalescent stage of minor medical conditions. Subjects were given Rotter's (1966) I-E Scale, and their socioeconomic status was assessed by the Two Factor Index of Social Position (Myers and Bean, 1968). No evaluation of patients' compliance was performed. Results showed that the dialysis patients were significantly more external in their orientation than were the control patients. Also, low socioeconomic status correlated

with externality among the control subjects, but the correlation was not significant among the dialysis patients. The investigators concluded that the stresses of renal failure and dialysis result in patients' defensively adopting an external frame of reference, and that this outlook renders them less likely to be responsible for their medical regimen. The authors suggested that patients' resultant noncompliance stems from a view that their behavior does not affect their condition. Regarding the finding about socioeconomic status, Goldstein and Reznikoff concluded that the prolonged stress of dialysis treatment results in externality among patients which transcends socioeconomic status.

Kilpatrick, Miller, and Williams (1972) examined the relationship between length of time on dialysis and locus of control among 39 patients from Charleston, South Carolina, and Atlanta, Georgia; and 46 controls from New York City. No measurement of compliance was employed. The investigators learned that contrary to their expectations, patients who had been treated longer were more internal on Rotter's I-E Scale. The authors postulated that "patients who do not learn that their medical condition is a result of their ... adhering to the treatment regimen do not survive" (p. 728). They attributed the relationship between the length of treatment and internality to the elimination, through death due to noncompliance, of externally oriented patients. Clearly, Kilpatrick et al., were inferring a relationship between compliance and locus of control which had not as yet been empirically supported.

In an empirical study designed to test the ability of locus of

control to predict compliance, Wenerowicz, Riskind, and Jenkins (1978) administered the I-E Scale (Rotter, 1966) to 19 patients at Mount Sinai Medical Center in Milwaukee, Wisconsin. The investigators employed a direct method of compliance assessment (see Table 1) and performed correlations between locus of control and compliance. They found that internal patients were significantly more compliant than externals on a composite measure of compliance. One of the individual criteria (phosphorus compliance) was similarly related to internality, and the other three (weight-gain, potassium, and BUN) showed positive, though nonsignificant, correlations to an internal outlook. The investigators concluded that locus of control is helpful in predicting patient compliance, but suggested that compliance is probably a multivariate phenomenon.

Employing a Health Belief Model (HBM) of behavior prediction (Rostenstock, 1966; Becker, 1974), Hartman and Becker (1978) studied compliance among 50 patients near Akron, Ohio. One section of the HBM interview included questions relating patients' locus of control expectancies. (The HBM will be explained in depth in the following section of this review.) Employing a direct method of compliance described earlier (under demographic variables), the investigators correlated patients' health perceptions and sociodemographic data with compliance. Regarding locus of control, they found that there was a general tendency for compliers to report feeling greater control over their life, though the item-by-item results were uneven. They found significant correlations between internality and phosphorus and potassium adherence on the items "In most situations I can control

what happens," and "If I take care of myself I can avoid illness." The authors characterized the noncompliant patient as "adopting an external (fatalistic) orientation concerning ability to control life events..." (p. 986).

Viederman (1974; 1978) discussed dialysis patients' need for control from a psychoanalytic perspective. He described internality in terms of "autonomous ego functions, the instinct to mastery, and effectance and competence" (1978, p. 456). He suggested that the well-adapted patient is able to effect a partial regression in service of the ego in order to respond to the dependent aspects of dialysis; and that this partial regression permits an independent and gratifying existence outside of the treatment (1974). In contrast, he stated that the maladaptive patient is characterized by the "totality of his regression" (1974, p. 76). Regarding compliance with the treatment regimen, Viederman stated:

> In my experience, those patients with a well-integrated, internal locus of control find the opportunities for effective adaptation to the treatment... they experience themselves as prime movers rather than controlled objects of an overwhelming life experience... (1978, p. 464).

Compliance with the regimen is an adaptive task which Viederman views as an opportunity for the internally-oriented patient to take control of his/her life condition.

In an impressive empirical study, Poll and Kaplan-DeNour (1980) studied the relationship between locus of control and adjustment among 40 patients in Israel. Adjustment was described three dimensionally: compliance, vocational rehabilitation, and acceptance of disability. Compliance was measured directly (see Table 1). Locus of control was

assessed via the I-E Scale (Rotter, 1966). Locus of control was found significantly related to all aspects of adjustment. The investigators interpreted the findings as indicating that internals adjust and adapt better to dialysis than externals. The authors cite other studies of locus of control among dialysis patients (Goldstein and Reznikoff, 1971; Kilpatrick, Miller, and Williams, 1972; Foster, Cohn, and McKegney, 1973; Wilson, Muzekari, and Schneps, 1974) in which patients had exhibited an external locus of control. They concluded that on the whole, dialysis patients represent an externally-oriented population. They concurred with Goldstein and Reznikoff (1971) that externality represents a psychological shift as a defense against the stress of renal failure and chronic illness, but they characterized the shift as maladaptive. They compared the external shift to the "total regression" observed by Viederman among poorly adapted patients (Viederman, 1974).

The Health Locus of Control Scale (HLC) developed by Wallston et al. (Wallston, Wallston, Kaplan and Maides, 1976), was used in an empirical study by Bollin and Hart (1982) to test the relationships among health belief motivations, health locus of control, health valuing, and dietary compliance. They employed a combined method of compliance measurement (see Table 1) with 30 patients at a veteran's hospital in Eastern Iowa. Similar to Poll and Kaplan-DeNour's (1980) finding, they learned that 21 of the patients (70%) exhibited an external locus of control. In all categories of compliance the externals did more poorly; however, as in the Wenerowicz et al. study (1978), only a composite compliance measure significantly

differentiated externals from internals. In both studies, this appears to be a problem with sample size (N = 19; N = 30) rather than weakness of relationship.

In another Health Belief Model report, Yanitski (1983) studied the compliance of 29 patients in Alberta, Canada (see Table 1). Subjects were administered the HBM questionnaire on two occasions, six months apart, and the item on the questionnaire were correlated with compliance. Of five items regarding locus of control expectancies, only one significantly correlated with compliance, and only during the second administration of the questionnaire. This item, "I trust my own feelings regarding my health more than a doctor's opinion," was answered positively by compliant patients significantly more often than by noncompliers. The dearth of significant correlations between compliance and locus of control needs perspective: Of the 116 items on the HBM, only four were significantly associated with compliance during either administration of the questionnaire, and one of the four pertained to locus of control. Yanitski concluded that compliant patients are more internally oriented than noncompliers.

In a recent anecdotal report, Prater (1985) stated that patients who use religious beliefs in an externally-oriented way often relinquish personal responsibility for their health care, and are noncompliant. She reported that internals, on the other hand, "seem to possess a sense of responsibility about themselves and ... take on active and compliant role in their case" (p. 504).

In contrast to the above reports, Blackburn (1977) found no relationship between locus of control, via the I-E Scale (Rotter,

1966), and compliance, in her study of 53 patients (see Table 1). She did comment, however, on the externality of the patient population, and she speculated that the dialysis experience itself contributed to a shift in patients' orientation.

To summarize, dialysis patients appear to be an externally oriented population, and some investigators interpret the externality as a defensive reaction, like denial, to the stresses of their medical condition. While adapting an external locus of control appears to be a common reaction of dialysis patients, the investigations reviewed imply that patients who are more internally oriented are more likely to adhere to the demands of the dialysis regimen. Of the six empirical studies examining locus of control's relationship to compliance (Blackburn, 1977; Hartman and Becker, 1978; Wenerowicz, Riskind, and Jenkins, 1978; Poll and Kaplan-DeNour, 1980; Bollin and Hart, 1982; Yanitski, 1983), five found evidence that internality is related to compliance, with only Blackburn's study finding no relationship between the variables. However, the evidence presented by HBM studies (Hartman and Becker, 1978; Yanitski, 1983) is uneven, and the studies by Wenerowicz et al. and Bollin and Hart suffer from small samples. The Poll and Kaplan-DeNour study is quite convincing, but cannot by itself provide assurance of a relationship between locus of control and compliance. While the literature is filled with psychological lore linking adherence to internality, further research is needed to verify the existence of the relationship.

While patients' defenses against anxiety can lead to noncompliance, some research indicates that high levels of anxiety

itself can also be a deterrent to compliance.

In their study already cited, Lee et al. (1978) found anxiety among the factors (anxiety/depression) on both the current and past scales of the Current and Past Psychopathology Scale, which were associated with poor compliance. They suggested that perhaps antianxiety medication would be helpful in modifying noncompliance in anxious patients.

Parker (1981) employed the State-Trait Anxiety Inventory (STAI) (Spielberger, Gorsuch, and Lushene, 1968) to test the effects of anxiety on 20 patients in a veteran's hospital in Georgia. The patients were chosen from a sample of 43 patients on the basis of their scores on the STAI, i.e., they represented the ten highest and ten lowest scores. The patients were followed for over two months, and observed for medical complications including fluid overloading (which was defined as a weight gain of three and a half kilograms or more between dialysis). The results of the study revealed that patients with high levels of anxiety had a significantly greater incidence of fluid overloading due to noncompliance than the low anxiety patients. Moreover, the high anxiety group required significantly more clinic appointments for treatment, reported more leg cramping, and had significantly more medical complications (over 100 more) than the low anxiety group. Interestingly, the low anxiety group showed a greater incidence of low blood pressure (hypotension) than the high anxiety patients. Parker speculated that the fluid overloading in the high anxiety group was due to the increased use of denial by these patients. This seems improbable since denial serves

to bind anxiety. A more likely explanation is that patients with high anxiety employed denial or repression less successfully than their low anxiety counterparts.

Kaplan-DeNour (1982) administered the Multiple Affect Adjective Checklist (MAACL) to 78 patients in Israel, as part of a study testing the usefulness of the Psychosocial Adjustment to Illness Scale (PAIS) in measuring the adjustment of dialysis patients. Scores on both instruments were correlated with physicians' assessments of patients' adjustment, consisting of physical condition, psychological condition, adherence to the diet, and vocational rehabilitation. Kaplan-DeNour learned that poor adjusters, as assessed by the nephrologists, had significantly higher anxiety scores on the MAACL. The four dimensional nature of adjustment ratings precludes an exact understanding of how anxiety affected compliance, but as one of the adjustment dimensions, compliance would appear to be adversely affected by high levels of anxiety.

Cheek (1982) utilized the Response to Illness Questionnaire (Pritchard, 1977) and a direct method of compliance assessment (see Table 1) to test whether the feelings which 27 patients in Louisiana had concerning their illness affected their compliance with the medical regimen. She learned that compliant patients reported significantly less anxiety than noncompliant patients. She suggested that compliant patients are more successful in controlling their anxiety, but did not report observations regarding patients' coping strategies.

In contrast to the research just presented, another study by

Kaplan-DeNour and Czaczkes (1974) reported no relationship between anxiety or depression and compliance. Working with 83 patients in Israel, the investigators employed three-point evaluations of anxiety and depression ("low, medium, or severe"), and nephrologists' three-point estimates of compliance ("good, fair, or bad"), to test the relationship between psychiatric adjustment and compliance. They learned that compliance was poor (40% of the patients were judged "bad" with respect to compliance), but psychological adjustment was fairly good. No patients developed severe anxiety or depression. Thirty-seven percent showed symptoms of medium depression and of medium anxiety, but no relationship was found between these conditions and patient compliance.

While the above studies examining anxiety's relationship to adherence present a mixed view, it appears safe to conclude that patients suffering high levels of anxiety are at risk of noncompliant behavior. The Kaplan-DeNour and Czaczkes (1974) study just cited is important in that regard because severe anxiety was not observed in over 80 patients examined, and yet compliance was still poor. Compliance problems were obviously associated with other factors. While high levels of anxiety may adversely affect patient adherence, psychological adjustment to dialysis seems to imply management of severe anxiety through use of defenses and/or adaptation to the treatment. Even when anxiety is successfully controlled, however, other factors already discussed (including the means of anxiety management) can lead to difficulties with the regimen.

The Health Belief Model

In the last decade, some investigators in dialysis research have utilized the Health Belief Model (HBM) in attempting to understand and explain patient compliance behavior. Originated by Irwin Rostenstock (1966), who drew upon social-psychological theory, the HBM was formulated as a value-expectancy model to explain preventive health behavior. Becker (1974) expanded the model to describe and explain illness behavior as well, including adherence to treatment regimens. The model postulates that adherence is a function of the patient's "readiness to act," which has five dimensions: his/her motivation relative to health matters; perceived susceptibility to a particular condition or its sequelae; perceived severity of the condition or sequelae; estimation of the potential benefits of adherence; and perception of the barriers to, or costs of complying (Becker, 1974).

In a report mentioned above, Hartman and Becker (1978) employed the HBM with 50 patients. Attitudinal data were gathered from each patient by means of an interview designed to elicit "perceptions of their state of health and other factors ... to operationalize ... the HBM (Hartman and Becker, p. 980). Seven-point Likert scales were used with items such as, "How worried are you about your kidney disease?" and "How much good does following the fluid limit do for you?" The authors found significant correlations among aspects of compliance and over 25 items presented in the interviews. They summarized their findings by characterizing the noncompliant patient as one who is less worried about personal health in general and about his/her kidney disease in particular:

> Although concerned about being able to carry out all the dialysis staff's instructions and about ... vulnerability to the consequences ..., he still maintains that it would not be very serious if he were to experience the sequelae of noncompliance... The poor complier also ... feels that one can "do ok" and still not follow ... the regimen closely, and sees a variety of barriers (difficulty, complexity, side effects) to compliance ... (Hartman and Becker, p. 986).

The authors also see noncompliant patients more likely to adopt an external locus of control orientation, to have poor frustration tolerance, and to seek secondary gains from their illness. These factors have already been discussed above. Hartman and Becker concluded that the HBM has value in explaining dialysis compliance behavior, stressing that each major dimension of the HBM proved useful in predicting compliance.

Kiriloff adapted the HBM in her study of 60 patients from five outpatient centers near Pittsburg. She tested patients' knowledge of the regimen and examined their beliefs about it, to learn to what extent compliance was associated with these factors. She found that all patients were well-informed regarding their prescribed regimen. However, beliefs about adherence to the regimen were consistent with patients' behavior. For example, noncompliant patients related more frequently than compliers that they ate "all" restricted foods. Similarly, noncompliers expressed their belief that it was necessary to follow their regimen "somewhat closely" (versus compliers feeling one should follow "very closely"). Noncompliers reported drinking no specific volume of fluid between treatments, while compliant patients identified a specific volume that they monitored each day. Kiriloff concluded that knowledge of the regimen is not a predictor of

compliance, but that patients' beliefs regarding the need to follow the regimen is a useful factor in compliance prediction.

In a large, empirical study designed to identify psychosocial correlates of compliance, Cummings and his associates (Cummings, Becker, Kirscht, and Levin, 1982) employed the HBM with 116 patients in Michigan. Utilizing both a direct method of compliance assessment (see Cummings et al., 1981, in Table 1), and patients' self reports of compliance, they found mixed results of the HBM's effectiveness. With the self report measures, patients' beliefs concerning the efficacy of compliant behavior and barriers to the behavior, along with fewer reported family problems, proved to be consistent predictors of compliance. However, for the direct assessment of compliance, i.e., medical chart information; dimensions of the HBM proved ineffective in predicting compliance. The investigators commented on the poorer validity of patients' self reports of compliance. They reported that "situational factors" (e.g., craving for food not on the diet, difficulty preparing special meals, frequently being thirsty, etc.) seem to be the chief determinants of compliance. They concluded that adherence is a "complex and multidimensional phenomenon" (p. 568).

In the study cited above, Yanitski (1983) had poor results using the HBM with 29 patients in Canada. As mentioned earlier, only four of 116 HBM items correlated with compliance on either of two administrations of the questionnaire. Nonetheless, Yanitski concluded that the HBM "appears to have some utility in explaining compliant behavior." Perhaps sample size (N = 29) limited the effectiveness of the HBM in predicting compliance, but it appears Yanitski's claim

regarding the utility of the HBM is unfounded, given her results.

The broad scope of patients' health perceptions which the HBM provides, allows researchers to gain a comprehensive assessment of patients' motivations for adherence. While showing mixed results in predicting compliance in the four studies presented above, the HBM nonetheless represents a promising approach to understanding and explaining dialysis patients' health motivations and behaviors. Though it was not employed in the present experimental study, it has been reviewed for it pertinence to compliance research (Mazur, 1981).

Interventions to Improve Compliance

Psychiatric Treatment

Despite early attention in the literature to the role and value of psychiatric intervention with dialysis patients (Wright, Sand, and Livingston, 1966; Crammond, Knight, and Lawrence, 1967; Kemp, 1967; Abram, 1968; 1969; 1974; Kaplan-DeNour, 1970), there have been no empirical studies published on the effectiveness of psychiatric treatment with compliance problems. In reviewing the role of the psychiatrist in the dialysis unit, Anderson (1975) concluded that psychiatrists are most needed for identifying and rectifying counter-productive interactions among patients and unit staff members. Levy (1981a) states that formal psychotherapy tends to be uncommon with dialysis patients because the patients feel "over doctored" (p. 361) and because confidentiality is difficult to ensure in a dialysis unit. Levy concurred with the suggestions of Lee et al. (1978), mentioned earlier, that depressed and anxious patients may well benefit from antidepressants or antianxiety medications. It is

reasonable to assume that when noncompliance is a secondary symptom of depression or anxiety, psychopharmacological management of the patient may lead to better adherence.

Abram (1974) exemplified the psychiatrist-as-consultant in the dialysis unit by recommending how dialysis personnel can best handle the "uncooperative" patient. He suggested "meeting the patient where he is and allowing him to live his life as he sees fit" (1974, p. 56). Abram cautioned that staff must keep their own motives and values clearly in mind, because attempting to change the patient to fit the staff's image or needs "will turn into unresolvable resistance from the patient and ... reach a stalemate" (p. 56). With noncompliant patients who are conflicted regarding independence, he recommended allowing them as much independence and responsibility for their own care as possible, a strategy which can both obviate acting out and prevent the development of regressive sick role behavior.

Behavioral Interventions

The prevalence of behavior modification studies in the dialysis compliance literature points to the effectiveness of this type of intervention in altering noncompliance. Noncompliant behaviors can be targetted and analyzed, with specific treatments designed to decrease excessive behavior, e.g., fluid overload, or to increase desired behavior, e.g., coming on time for dialysis runs.

Barnes (1976) described the treatment of a case of fluid overload, in which he used a token economy to control the problem. The token economy utilized water as a reinforcer. By observing diet restrictions, the 42 year old, male patient earned points which could

be exchanged for water (not to exceed 800 c.c.'s per day). Within one week, there were marked improvements in mood and weight gains. After six months, the patient was continuing compliance and was physically active.

In two other studies, researchers used token economies with varying success to increase compliance with dietary regimens. Magrab and Papadopoulou (1977) worked with four children on dialysis, ages 11 to 18 years, who were noncompliant with the diet. The investigators used weight gain, potassium, and BUN as the compliance criteria. As with Barnes (1976), the investigators rewarded points to the patients for adherent behavior; these points could be exchanged for prizes (toys, money, etc.). The program was effective in controlling the patients' weight gain, potassium and BUN levels. In another study employing a token economy, Hart (1979) reported mixed results. He worked with ten adult patients from two centers in Texas. Patients were volunteers, and it was not indicated whether they were chronic abusers of the diet. Baseline data for weight and potassium levels were established for each of the patients over a three week period prior to treatment. The token economy was then used for one month. The results showed that patients' weight was significantly decreased but their potassium level remained unchanged. Hart concluded that a token economy has therapeutic merit for the treatment of fluid overload, but recommended further research to verify its effectiveness.

Keane and associates (Keane, Prue, and Collins, 1981) reported two case studies illustrating the effectiveness of behavioral

contracting in improving compliance to fluid restrictions. Two chronic fluid overloaders from a Veteran's Hospital in Mississippi were treated individually, utilizing palatable meals, staff praise, and social interactions as contingency rewards for meeting weight-gain criteria. Both patients evidenced significant reductions in interdialysis weight-gains, and these changes were maintained over periods of 40 and 37 weeks respectively.

Cummings et al. (1981) compared the effectiveness of three intervention strategies in improving compliance among 116 patients in Southeastern Michigan (see Table 1). The treatments were behavioral contracting with the patient, behavioral contracting with a family member or friend, weekly telephone contacts, and a nonintervention control. The behavioral contract interventions were the same, with the exception that a third party selected by the patient participated in the "behavioral contract with family member or friend" intervention. Both used state lottery tickets as rewards for meeting the contract criteria. The telephone contact strategy involved gathering information from patients regarding problems they were having in following the regimen, providing information about the complications of noncompliance and the benefits of adherence, suggesting techniques for better compliance, and providing verbal encouragement for maintaining adherence. Patients' compliance was assessed at the beginning of the study (T_1), immediately following the six-week intervention period (T_2), and three months later (T_3). Results showed that the three interventions were effective in improving compliance between T_1 and T_2, with no significant

differences among treatments. In general, however, treatment gains returned to baseline levels once the treatments were discontinued. The investigators concluded that a need exists for long-term intervention programs.

While some of the studies reviewed above show mixed results, in general, behavioral treatments appear promising in their capacity to modifty intractable compliance problems. In addition, the act of involving the patient in a contract, token economy, etc., may have promise in promoting an increased sense of self-control (Lira and Mlott, 1976).

Hypnosis

Several investigators have reported on the effective use of hypnosis to relieve a variety of symptoms (e.g., pain, anxiety, pruritus, insomnia, etc.) and to improve compliance, among dialysis patients (Dy and Fabri, 1972; Scott, 1973; Morrill, 1978; Dimond, 1983; Martin, McHugh, Millar, Gibbons, Morgan, and Dickinson, 1983; Surman and Tolkoff-Rubin, 1984). The capacity of hypnosis to reduce anxiety (Hurley, 1980) and to remove symptoms without threatening patients' defense mechanisms (Franklin, 1964; Spiegel, 1967), makes it particularly well suited to dialysis patients, who suffer anxiety and require some denial for adequate adjustment (Goldstein and Fenster, 1973). Kaplan-DeNour and Czaczkes (1972) recommended that hypnosis be employed to improve adherence among patients with low frustration tolerance for whom traditional therapy was unsuccessful.

Dy and Fabri (1972) reported on a case of 21 year old, female patient who suffered overwhelming anxiety, dyspnea (shortness of

breath) and psychological dependence on an artificial respirator. The use of hypnosis resulted in reduction of her anxiety, with concomitant relief of the dyspnea. The patient's dependence on the respirator was extinguished, and she became medically manageable. The authors concluded that hypnosis was useful with dialysis patients, and suggested that as a tranquilizer, it seems safer than medication.

The only controlled, experimental study of the effectiveness of hypnosis in improving dialysis compliance is Morrill's (1978) unpublished dissertation. She investigated the joint effects of hypnotherapy used for relaxation and cognitive treatment on self concept, locus of control, weight gain between dialysis, and physiological measures of stress consisting of blood pressure, pulse rate, and respiration rate. Twenty-six patients in a maintenance hemodialysis unit were randomly assigned to one of four treatment groups: cognitive, hypnotherapy, cogntive-hypnotherpy, and control. Pretest and posttest measures of the dependent variables were used to assess the effectiveness of the various treatments over a period of eight weeks. Results indicated that while the cognitive treatment had a significant effect on some aspects of self-concept (as measured by the Tennessee Self-Concept Scale), hypnotherapy significantly increased the Total Positive Score of self-concept. More importantly, hypnosis had a significant effect on locus of control, weight gain, and all the physiological measures of stress except for pulse rate. Morrill concluded that hypnosis was effective in helping patients experience reduced stress and to experience more control over their condition, as seen in their improved compliance.

Dimond (1981) described his treatment of a 30 year old, female patient who was unable to attain adequate blood flow volume due to an injection phobia and a low threshold of pain. Twelve sessions of hypnosis which emphasized desensitization, pain control, mastery, and self-control, resulted in the patient's overcoming her fear of injection, and producing an adequate blood flow. Moreover, the patient seemed quite comfortable on dialysis, and reported that she "was finding it increasingly easier to maintain her diet including the required low fluid intake" (Dimond, p. 286). Dimond commented that the hypnotherapy was presented in a "meta framework of mastery" (p. 287) to acknowledge and utilize the patient's need for independence.

Recently, Martin and associates (Martin, McHugh, Millar, Gibbons, Morgan, and Dickinson, 1983) reported on the applications of hypnosis on a dialysis unit in England. They treated 18 patients for 26 complications of dialysis, including two cases of noncompliance. The authors reported that post-hypnotic suggestions were successful in overcoming these two patients' compliance problems. They were successful treating 24 of 26 complications through various hypnotic techniques, i.e., deep relaxation, hypnotic analgesia, content reframing. They concluded that hypnosis was a simple and safe technique for treating dialysis complications, commenting that its use had resulted in an improved rapport between patients and staff.

Finally, Surman and Tolkoff-Rubin (1984) discussed their use of hypnosis with dialysis patients, from the point of view of patients' need for control:

At the center of any problem dialysis situation is a patient who

> is attempting to establish control ... Hypnosis is well suited to this goal because it need not threaten the successful use of denial (1984, p. 31).

The authors provided five case studies in which problems secondary to dialysis were treated by hypnosis. Two of the cases included, among other problems, aspects of noncompliance. The investigators were unsuccessful in altering the noncompliance of one patient (though they relieved his severe hiccups), and they succeeded in improving the compliance of the other patient. They commented, like Morrill (1978) and Dimond (1981), that hypnosis was utilized in each case for its capacity to improve perceived mastery and control.

The few reports presented above indicate that hypnosis has been employed effectively to reduce anxiety, improve adherence, and impart a sense of personal control among dialysis patients. Morrill's (1978) controlled study clearly presents the most convincing evidence of the capacity of hypnosis to control fluid intake and modify patients' locus of control expectancies. The other reports, while impressive, are all case studies, and do not provide psychometric or statistical data, nor present comparisons with other interventions or with experimental controls. Further experimental research examining the capacity of hypnosis to control dialysis noncompliance could lend credence to the findings of Morrill and the other investigators regarding the effectiveness of hypnosis with dialysis patients.

Summary

This review has examined the assessment and magnitude of hemodialysis noncompliance, along with methodologic problems inherent in dialysis research; it discussed and analyzed factors associated

with noncompliance, including demographic factors, psychological variables, and factors associated with the dialysis regimen; and finally, the review identified and evaluated interventions designed to improve dialysis adherence.

Half the patients reviewed in the literature were noncompliant with some aspect of their regimen, an alarming figure given the lethal consequences of nonadherence. Demographic variables were shown to be of no value in predicting or explaining dialysis noncompliance, a finding consistent with medical research. Nonetheless, the present research analyzed the most frequently examined variables: age, sex, education, and length of time on dialysis, for further information regarding these variables' relationships to compliance among a mostly Black patient population.

The review of psychological factors affecting adherence revealed noncompliant behavior to be a complex and, perhaps, overdetermined phenomenon. A fierce dependence-independence conflict confronts the dialysis patient, and his/her idiosyncratic struggle with it can result in noncompliance. High levels of anxiety and depression are among psychiatric complications of renal failure and dialysis, and these conditions can also contribute to adherence problems. The patients' attempts to cope with the overwhelming stresses of their condition, by adopting an external locus of control or by a massive use of denial, may also lead to poor compliance. The present experimental research examined measured assessments of patients' anxiety and locus of control expectancies.

Finally, the review of interventions designed to improved

dialysis adherence indicated that while insight-oriented psychotherapy appears to be less effective with compliance problems, brief behavioral and hypnotherapy interventions have demonstrated effectiveness in modifying compliance behavior.

The present investigation builds upon Morrill's (1978) research and that of Cummings and his associates (1981). Morrill found hypnosis effective in improving fluid adherence, altering locus of control, and reducing patients' stress. Cummings et al. found three different behavioral interventions successful in improving patients' fluid compliance. This experimental research compared hypnotherapy similar to that provided by Morrill, with a "coaching" treatment which resembled the telephone contact intervention employed by Cummings et al. The treatments were compared for their effectiveness in improving adherence, fostering internality, and reducing anxiety. The study also allowed for analysis of the relationships between locus of control and compliance, and between anxiety and compliance. The methodology by which the study was conducted is presented in the following chapter.

CHAPTER III

METHODOLOGY

Introduction

The purpose of this study is to investigate the effectiveness of hypnotherapy and an educational coaching treatment in improving the medical compliance of noncompliant hemodialysis patients, altering patients' measured locus of control expectancies, and reducing their anxiety. In addition, the study is designed to examine the relationships among various independent variables - age, sex, educational level, socioeconomic status, length of time on dialysis, and hypnotizability - and the dependent measures of compliance, anxiety, and locus of control.

This chapter presents the methodology used to achieve those purposes.

Independent Variables

The main independent variables in this experimental study are the various treatments: hypnotherapy, compliance "coaching" by the investigator, compliance "coaching" by the dietician at the dialysis center, and a no treatment control condition.

Other independent variables were examined: age, sex, educational level, length of time on dialysis, and hypnotizability.

Dependent Variables

The dependent variables in the study are the measures of compliance, locus of control, and anxiety.

Subjects

The subjects in this experiment were seventy-two adult, maintenance hemodialysis patients who receive their dialysis treatment at the Chicago Kidney Center, Chicago, Illinois. The Chicago Kidney Center is a free-standing or satellite dialysis center.

The seventy-two patients who participated in the study were drawn from a patient population of one hundred twenty-nine who were registered at the Chicago Kidney Center on February 10, 1984.

Table 3

Patients Excluded from the Study

	Frequency	Per Cent (of 129)
Patients choosing not to participate	11	8.52
Patients who could not understand English	13	10.07
Patients not receiving dialysis on either Friday or Saturday	13	10.07
Patients judged mentally or psychologically unfit	13	10.07
Patients judged medically at risk	1	0.77
Patients planning to leave the Center (to transfer or to receive a transplant)	4	3.10
Patients hospitalized at the beginning of the study	2	1.55
Total	57	44.1

Table 3 illustrates the frequencies and percentages of patients excluded from the study for various reasons. Thirteen patients were screened out of the study on the basis of mental deficiency and/or psychological risk. To determine which patients should be excluded for these reasons, the experimenter met in conference with the chief nephrologist at the Center, and with the head nurse. A determination was made that all patients with a psychiatric inpatient history would be excluded (two patients), and that any patients recently evidencing a psychiatric disorder (as determined by the staff) would also be excluded. The nephrologist excluded nine more patients on the basis of senility or dementia. Later, the experimenter eliminated two other patients, (one depressed, the other showing poor reality orientation and agitation) on the basis of personal interviews.

The head nurse and dialysis technicians advised the experimenter which patients could not understand English. The nephrologist recommended that one patient be excluded on the basis of medical risk, i.e., heart condition. Four patients advised the experimenter that they were leaving the Center before the study would be completed.

Table 3 reveals that thirteen patients were excluded because they did not receive dialysis when the experimenter was present at the Center. Most hemodialysis patients currently receive treatment three times weekly, on a schedule of Monday, Wednesday, Friday; or Tuesday, Thursday, Saturday. The thirteen patients excluded on the basis of schedules either received only two dialysis treatments a week, or received three on a schedule of Monday, Wednesday, Thursday.

Eleven patients chose not to participate in the study. Two of

these initially signed written consent forms to participate, but then refused to fill out one of the psychometric instruments. When questioned by the experimenter, both stated that they no longer wished to be part of the study, but they did not elaborate.

Selection of the Sample

As mentioned in Chapter I, a purposive or deliberate sample of patients was selected for inclusion in the various treatment groups in the study. Fifty-two experimental and control subjects were chosen from the remaining seventy-two subjects, on the basis of their external locus of control orientation and their noncompliance with the medical regimen of hemodialysis. Proceeding from the literature reviewed in Chapter II, linking noncompliance with externality, the experimenter chose to treat subjects evidencing both of these conditions, in order to further investigate the relationship between them.

Instrumentation

In this section, a discussion of the instruments used in the study are presented. In addition, copies of each can be found in Appendix A.

The Kaplan-DeNour and Czaczkes Compliance Scale

Compliance to the medical regimen of hemodialysis was measured by a ten-point scale which is a modified version of the scale created by Drs. Kaplan-DeNour and Czaczkes (1972). In its original form (1972), Kaplan-DeNour and Czackes' scale measures compliance on a five point basis, using objective, medical chart information regarding patients' weight-gain between dialysis, serum potassium levels, and blood urea

nitrogen (BUN) levels as criteria. The scale provides for patients to be assessed as demonstrating (1) "excellent compliance," (2) "good compliance," (3) "fair compliance," (4) "some abuse," or (5) "great abuse." Since the 1972 version of the scale did not specify numerical BUN limits for each compliance category, in 1974, the scale's creators provided numerical BUN criteria. However, they also dropped the "excellent compliance" and "great abuse" categories of the instrument, retaining a three point scale: "good compliance," "fair compliance," and "bad compliance." Finally, in the most recent use of the scale, with Ira Poll (Poll and Kaplan-DeNour, 1980), Kaplan-DeNour returned to the use of all five categories of compliance.

As mentioned in the literature review in Chapter II, the dialysis compliance research is marked by a lack of consistency regarding the assessment of compliance. Kaplan-DeNour and Czaczkes' scale has been used in four other studies to date (Winokur, Czaczkes, & Kaplan-DeNour, 1973; Kaplan-DeNour and Czaczkes, 1976; Skotakis, Acchiardo, Martinez, Lorisch & Wood, 1978; and Poll & Kaplan-DeNour, 1980), and is the only compliance instrument which has appeared in the research more than once. As the most widely-used instrument available, it nevertheless provides no estimates of reliability or validity (nor do any of the other compliance assessment instruments). Regarding the scale's validity, the authors simply describe the scale as "a quite accurately defined five-point scale ranging from excellent adherence to great abuse" (Kaplan-DeNour and Czaczkes, 1972, p. 335).

In the present study, the experimenter has augmented the scale to increase its sensitivity among markedly noncompliant patients. In the

early planning stages of the study, the experimenter discussed the scale with the chief nephrologist at the Chicago Kidney Center, Dr. George Dunea. Dr. Dunea advised that the patient population of the Center was, as a whole, extremely abusive of the dialysis fluid restrictions. Consequently, the scale would not differentiate among patients in the "great abuse" category, i.e., "extreme abusers" would be grouped with simple "great abusers". Therefore, the experimenter enlarged the scale to ten categories of compliance, using the same incremental method for defining new categories employed by Kaplan-DeNour and Czaczkes. Each new category represents a mean weight-gain range of one and one-tenth pounds greater than the previous category and a mean BUN range of twenty milligrams per cent (of whole blood) greater than the previous category. For potassium values, Kaplan-DeNour and Czaczkes' method was followed for creating a sixth category, i.e., the category represents a mean serum potassium range of five tenths milliequivalents (mEq.) per liter greater than the fifth category. However, the nature of serum potassium as a body chemistry prohibits extending potassium values beyond a sixth category (see augmented scale in Appendix A). Potassium values near 7.0 mEq./L. are considered lethal (Gutch and Stoner, 1975). Therefore, describing the range of potassium values in the seventh category as between 8.01 and 8.5 mEq./L. would be irrelevant since no patient could possess such a level of potassium. (No patient in the present study had a serum potassium level exceeding 7.2 mEq./L.) Consequently, categories seven through ten are defined by the weight-gain and BUN criteria alone.

Assignment of compliance scores is done in the following way. A patient is assigned a score corresponding to the highest, i.e., most noncompliant, category in which he/she meets at least one of the criteria. Therefore, a patient gaining an average of 7.83 lbs. between dialysis for a given period of time, e.g., two months, would be given a score of 6, corresponding to the sixth compliance category, even if he/she had excellent potassium adherence, e.g., 4.8 mEl./L., and good BUN compliance, e.g., 67.6 mg. per cent. The score of 6 would indicate that the patient was very abusive of the dialysis regimen, though it were based solely on his/her fluid weight-gain. A high score on Kaplan-DeNour and Czaczkes' scale, then, does not designate in which specific area(s) of the regimen a patient is noncompliant; rather, it serves to identify dangerous noncompliance to some part of the prescribed regimen. Further examination of the specific noncompliant behavior can easily be performed once it is known that a patient is not adhering to some part of the regimen.

While extending the scale to ten compliance categories the experimenter has not changed the basis on which Kaplan-DeNour and Czaczkes' scale assesses medical compliance. Patients receiving scores of 3 or below are still judged compliant, and patients assessed scores of 4 or above are judged to be noncompliant. However, by extending the noncompliant categories from two categories (scores 4 and 5) to seven (scores 4-10), the experimenter has made it possible to observe and measure differences in degree of noncompliance among patients who severely abuse the dialysis medical regimen.

The method by which the scale was used in this research will be

explained below under "General Procedures."

Rotter's Internal-External Scale

The construct locus of control was measured in the present study by Rotter's (1966) Internal-External (I-E) Scale, a 29-item, forced-choice test (including six filler items). Rotter (1966) considers the test to be a measure of the subject's generalized expectancies for control of reinforcement. Subjects are forced to choose between two differing views on each item, internal or external. The internal-external dimension refers to the degree to which an individual perceives the events which happen to him/her as contingent upon his/her own behavior (internal) or upon luck, fate, or powers beyond his/her control (external). The score of the I-E scale is expressed as the number of external responses, with a range from 0 to 23. Low scores are indicative of an internal locus of control and high scores of an external locus of control.

Estimates of internal consistency of the scale, reported by Rotter (1966) range from .69 to .79, and test-retest reliability from .49 to .83. Regarding the construct validity of the scale, Rotter summarizes the results from a series of validating studies by concluding that:

> the individual who has a strong belief that he can control his destiny is likely to (a) be more alert to those aspects of the environment which provide useful information for his future behavior; (b) take steps to improve his environmental condition; (c) place greater value on skill or achievement... and (d) be resistive to subtle attempts to influence him (Rotter, 1966, p. 25).

The most common procedure for scoring the I-E scale with a group of subjects is to compute each individual score and then establish a

median score. Subjects in the upper half of the distribution of scores are then identified as externals and those in the lower half as internals (Rotter, 1966). This procedure was not the method chosen to establish internality and externality among the sample of hemodialysis patients in the present study.

Rotter (1966) warns that the method of using a group median to establish internals and externals lacks validity when generalizing to the population at large. For example, a subject who is in the lower distribution of an externally- oriented population will be labelled "internal" while in fact he/she may be more external than the mean of the population at large. This would appear to be the case with dialysis populations (Poll and Kaplan-DeNour, 1980). As mentioned in Chapter II, dialysis patients are reported to be an externally-oriented population in general. In the present study, use of a median score to differentiate internals and externals would have inaccurately identified patients scoring below the median as internals, and would have eliminated them from the treatment phase of the study. To avoid this methodological error, the experimenter chose a cutoff score by referring to the normative data provided by Rotter and that presented in the dialysis research literature.

The largest population for which Rotter (1966) provides mean and standard deviation scores is an Ohio State University population of 1180 elementary psychology students. The mean is 8.29 and the standard deviation 3.97. Rotter also suggests a significant difference in locus of control expectancies between white and black populations. He cites a study by Lefcourt and Ladwig (1965) in which

black and white adult inmates from two correctional institutions who were not different in social class, age, intelligence, or reason for incarceration showed significant differences on the I-E Scale; Whites had a mean of 7.97 (S.D. 3.03) and Blacks a mean of 8.97 (S.D. 2.97). While Blacks in that study were significantly more external than whites, their mean score was less than the cut-off score chosen in the present study to identify externals. It can be stated, then, that subjects scoring 9 or above on the I-E Scale probably possess an external orientation.

The research to date regarding locus of control and hemodialysis also supports a cutoff score of 9 or above for externals. Foster, Cohn, and McKegney (1973) report Rotter's normative mean as "approximately 8.0 in a normal population" (1973, p. 66). Blackburn (1977) similarly reports the normal range of the I-E scale as 7.5 to 8.0. Poll and Kaplan-DeNour (1980), indicating that "on the whole dialysis patients exhibit external locus of control" (1980, p. 156), cite, as examples of externality among dialysis patients, studies by Kilpatrick, Miller, and Williams (1972) and Goldstein and Reznikoff (1971) in which patients obtained mean I-E scores of 8.88 and 9.55 respectively.

In the present study, subjects receiving a score of 8 or below were identified as internals, and those scoring 9 or above as externals. By establishing a cutoff score of 9 or above to identify externals, the experimenter avoids eliminating "false internals" from the treatment phase of the study, utilizes the normative data provided by Rotter regarding the scale, and remains consistent with the

dialysis research involving the use of the I-E scale.

Short Form of the Manifest Anxiety Scale

Anxiety was measured in the present research by means of Bendig's (1956) shortened version of Taylor's (1953) Manifest Anxiety Scale (MAS). Bendig's Short Form consists of twenty true or false items which concern "overt or manifest symptoms of internals' anxiety" (Taylor, 1953, p. 285).

Bendig created the shortened version by selecting the twenty most consistently valid items of the fifty items on the MAS, as determined by previous validation studies. Hoyt and Magoon (1954) and Buss (1955) reported tha although Taylor's scale demonstrated good construct validity, many individual items on the scale were "not valid in predicting clinical criteria of manifest anxiety" (Bendig, 1956, p. 384). Bendig postulated that a short form of the MAS, retaining only the valid items, would be more useful and clinically valid than the standard MAS (Bendig, 1956).

Normative data for the twenty item scale are presented in Table 4 below.

Table 4

Norms of the Short Form of The Manifest Anxiety Scale

Sex Group	Mean	Standard Deviation	Reliability (Kuder-Richardson)
Male	5.63	3.74	.75
Female	5.71	3.71	.74
Total	5.65	3.74	.75

The internal consistency reliability presented in Table 4 is only slightly less than that reported for the fifty-item MAS, .82 (Taylor, 1953). Bendig concludes that while retaining a high level of reliability, the Short Form of the Manifest Anxiety Scale is more valid in predicting clinical criteria of manifest anxiety, and is more parsimonious of testing time.

The Stanford Hypnotic Clinical Scale for Adults

Hypnotizability was measured with a modified version of Morgan and Hilgard's (1975) Stanford Hypnotic Clinical Scale for Adults. The scale is a five-item hypnotizability instrument which is adapted to clinical populations. The creators of the scale point out that longer, research-oriented hypnotizability scales have certain features, e.g. their length, and the amount of physical mobility and muscular effort involved; which make them less suitable for certain patient populations (dialysis patients, for example). The Stanford Hypnotic Clinical Scale for Adults is short enough not to tire medical patients (it requires approximately 20 minutes to administer), and it allows the patient to be seated in a chair or in bed, sitting or lying down.

The five items which comprise the scale are: "moving hands together" (or "hand lowering", as an alternative for patients with an immobile arm, e.g., dialysis patients), "dream," "age regression," "posthypnotic suggestion," and "posthypnotic amnesia." All five items were modified by Morgan and Hilgard items already tested on the Stanford Hypnotic Susceptibility Scales, Forms A, B and C (Weitzenhoffer and Hilgard, 1959, 1962), and were selected for their

capacity to "tap the kinds of processes most likely to be used in therapy" (Morgan and Hilgard, 1979, p. 134). In the present study, the experimenter, in discussion with the hypnosis consultant on his dissertation committee, substituted for "age regression" another item from the Stanford Hypnotic Susceptibility Scale Form A, "fly hallucination." The experimenter and his consultant held that while the capacity to enjoy age regression may be useful in psychotherapy, the experience of age regression might precipitate untoward psychological reactions within the dialysis patients beyond their expectations for participation in the research project. "Fly hallucination" was selected as a substitute item due to its innocuous nature and its degree of difficulty, i.e., the percent of subjects who "pass" or exhibit the required behavior of the item. Table 5 presents the percent of subjects passing each item on the Stanford Hypnotic Clinical Scale for Adults, derived from the authors' normative data (Morgan and Hilgard, 1979, p. 136), and includes the percent of subjects passing "fly hallucination", from the Stanford Hypnotic Susceptibility Scale, Form A (Weitzenhoffer and Hilgard, 1969, p. 54). Table 5 indicates that "fly hallucination" is a more difficult item to pass than "age regression." The experimenter included another difficult item on the scale to further identify highly hypnotizable subjects in the study.

Table 5

Percent of Subjects Passing Each Item of the Stanford Hypnotic Clinical Scale for Adults, and Percent of Subjects Passing "Fly Hallucination" on the Stanford Hypnotic Susceptibility Scale, Form A

Item	Percent Passing
Moving hands (hand lowering)	81
Dream	60
Age regression	66
Posthypnotic suggestion	27
Amnesia	40
Fly Hallucination	35

Table 6 provides the normative data for the scale as presented by its creators (Morgan and Hilgard, 1979, p. 135). The scale was normed on 111 Stanford University undergraduates who had been selected from a full range of scores (0-10) on a shortened 10-point version of the Harvard Group Scale of Hypnotic Susceptibility, Form A (Shor and Orne, 1962).

Table 6

Stanford Hypnotic Clinical Scale for Adults

Normative Data (N=111)

Susceptibility Level	Raw Scores	Number of Cases	Percentage of Cases
High	5	14	12
	4	28	25
Medium	3	26	23
	2	15	14
Low	1	15	14
	0	13	12
Cases		111	100%
Mean		2.75	
S.D.		1.56	

(Morgan and Hilgard, 1974, p. 135)

As can be seen in Table 6, subjects scoring 4 or 5 are considered highly hypnotizable, those scoring 3 or 2 are in the medium range, and subjects scoring 1 or 0 show little susceptibility to being hypnotized.

Morgan and Hilgard presents a reliability estimate for the scale of .72, obtained from a product-moment correlation between the total score on the scale and the total score on the Stanford Hypnotic Susceptibility Scale, Form C, both of which were administered to the norming sample. The authors claim that the clinical scale:

> appears to be a reliable estimate of hypnotic responsiveness as measured by the longer standardized procedures, and valid to the extent that the SHSS:C (Stanford Hypnotic Susceptibility Scale, Form C) is valid (Morgan and Hilgard, 1979, p. 136).

General Procedures

The overall procedural aim of the study was to obtain measures of the experimental and control subjects' medical compliance, locus of control, and anxiety before and after the treatment phase of the study, and then to analyze whether the treatments had been effective in improving compliance, altering locus of control, and/or lowering anxiety. The procedures by which this aim was accomplished are described below.

Orientation to the Study

Following the recommendations of Morrill (1978), the experimenter spent two days a week (Friday and Saturday) for approximately three months (February-April, 1984), informally interacting with the patients and staff of the Chicago Kidney Center prior to the initiation of the treatment phase of the study. During that time, the experimenter was introduced to all the patients and spent time chatting briefly with patients and staff.

The nature and purpose of the research project was explained to both staff and patients, and it was received with general interest and enthusiasm. The purpose of the research was explained to the patients as an attempt to learn what can be done to make the adjustment to the dialysis regimen easier for patients. Patients were told that they would be given some paper and pencil instruments and that medical chart information would be used to assess their adjustment to the hemodialysis regimen. Furthermore, patients were advised that there would be a treatment phase to the study which would include two different treatments designed to help patients adjust more easily to

the regimen. The experimenter advised that he was currently completing his doctorate degree at Loyola University, and that he was employed as psychotherapist. The chief nephrologist at the Center and the medical staff encouraged all patients who were interested to participate in the study.

As mentioned earlier, the experimenter met in conference with the chief nephrologist and head nurse, to discuss which patients, if any, should be excluded from the study on the basis of mental, psychological, or physical risk. The experimenter was given a list of such patients. At that time, April, 1984, the head nurse and some of the Hispanic dialysis technicians advised which patients could not understand English, and these patients were also excluded from the research.

Once these patients were eliminated, the experimenter interviewed each of the remaining patients in the study. During these interviews in April, 1984, the experimenter: (1) gathered information regarding their educational level; (2) inquired about, and screened for, symptoms of psychopathology; (3) presented and explained the consent form for the research (see Appendix A), and obtained written consent from those patients wishing to participate. As mentioned earlier, the experimenter excluded two more patients from the study on the basis of overt psychopathology. When both patients were brought to the attention of the medical staff by the experimenter, it was confirmed that they had been previously overlooked during the screening conference. With these patients excluded, the experimenter obtained written consent from seventy-four patients, and assigned each an

arbitrary identification number.

Collection of the Data

Once the seventy-four subjects in the sample had given their written consent, the experimenter collected the compliance data and additional demographic information from the medical charts, and administered the psychometric instruments to all participants in the study.

The demographic information available in the charts included: (1) length of time or dialysis (in months); (b) age, sex, race; (c) income level. This information, as well as the subjects' educational level (obtained earlier through interviews), is reported in Chapter IV.

The medical charts provided monthly reports of subjects' BUN and potassium "chemistries" in a section of the chart called "Laboratory Reports," and they also provided a running record of subjects' thrice-weekly weight-gains between dialyses in a separate section. The experimenter had full access to the charts and received occasional clarification of notation in the charts from the technicians or other staff.

BUN and potassium values for three months prior to the treatment phase (February, March, and April, 1984) were obtained by the experimenter for each patient, and averaged. The mean scores represent the pretest values for these compliance criteria. The posttest values for BUN and potassium levels were obtained by collecting the May, June, and July, 1984, chemistries, and computing mean scores.

Weight-gain measures for ten weeks prior to the treatment phase

were obtained by the experimenter for each patient. Mean scores were computed for each patient and represent the pretest values for this criteria of compliance. Posttest values were obtained by computing weight-gain mean scores for the ten weeks during which the treatments were provided to the subjects. (The thrice-weekly nature of this criterion also allowed for ongoing analysis of effectiveness of the treatments; this will be discussed under "Statistical Analysis.")

The I-E Scale and Bendig's Short Form of the Manifest Anxiety Scale were administered to the sample subjects while they were receiving their dialysis treatments. Patients are "on the machine", as the staff describes it, for approximately four hours each dialysis. During that time, there is great variability among the patients' behavior and physical conditions. For example, most patients sleep during some part of their treatment, many watch television, some chat with other patients or staff, and the nephrologist examines patients during rounds. Usually in each four hour shift, a number of patients experience discomfort or pain. Some, usually due to severe fluid overloading, will need respirators to aid their breathing. As a result of the variability of patients' physical conditions and behavior, the experimenter administered the psychometric instruments to subjects when the subjects stated that they felt well enough to take them.

Pretest data for locus of control and anxiety were obtained by administering the Rotter I-E Scale and the Bendig Short Form of the MAS during April, 1984. The experimenter deliberately chose to give subjects the I-E Scale first, rather than randomly administer the two

tests, because the I-E takes longer to complete and involves more reading. The experimenter felt that some patients might tire and not complete the scale if it were given after the Bendig Scale. (As it turned out, some patients did tire completing the I-E, but were successfully encouraged to complete the brief anxiety test consisting of only twenty true or false items.) During the administration of the Rotter I-E Scale, two of the seventy-four sample subjects stated that they no longer wished to participate in the study. They were excluded, leaving seventy-two subjects in the research.

Posttest data for the locus of control and anxiety measures were obtained by readministering the Rotter and Bendig scales the week of July 1984. Administration of the hypnotizability scale took place after subjects were selected for the purposive sample and assigned to treatment groups.

Selection of the Purposive Sample

Subjects were selected for the purposive sample, and were thus eligible to receive one of the treatments, on the basis of their being identified as noncompliant with the medical regimen, via the Kaplan-DeNour and Czaczkes Scale, and having an external locus of control, as determined by their scores on the Rotter I-E Scale. After the compliance data had been gathered from the medical chart of each subject, compliance scores were assigned via the Kaplan-DeNour and Czaczkes Scale. Those subjects receiving scores of 4 or above were identified as noncompliant. As mentioned above, subjects scoring 9 or above on the Rotter I-E Scale were identified as externals. Fifty-two subjects were selected to the purposive sample as both noncompliant

and external. The internals and compliant subjects, who, coincidentally, were mutually exclusive, were advised that they could receive one of the treatments once the study was completed.

Randomization

Once the purposive sample had been selected, the experimenter randomized the fifty-two subjects into four separate groups: (1) the no treatment group which consisted of subjects who did not receive one of the treatments during the treatment phase of the study, but were advised that after the ten weeks of treatment they could receive one of the treatments (i.e., hypnosis or coaching) if they wished; (2) the hypnotherapy group; (3) the coaching group which was treated by the experimenter; and (4) the coaching group treated by the dietician at the Center.

Randomization was carried out in the following manner. First, the experimenter chose to select out the no treatment group. By so doing, he reduced the number of subjects to whom it was necessary to administer the hypnotizability scale prior to the initiation of the treatment phase of the study. Listing the 52 subjects in chronological order of their arbitrary identification numbers, the experimenter used a random units table to select 13 subjects for the no treatment control group. The first 13 subjects randomly chosen comprised the group.

After consulting with the hypnosis consultant of his committee, the experimenter next administered the hypnotizability scale to the thirty-nine remaining subjects. Subjects were hypnotized while receiving their dialysis treatment. Despite the constant noise in the

center, the presence of other patients and staff, and the occasional need for technician interruptions, nearly all the subjects exhibited some hypnotic responsiveness (results appear in Chapter IV).

Once the hypnotizability scale had been administered and scored, the thirty-nine subjects were randomized into the three treatment groups.

When the three groups were filled, the experimenter performed a one-way analysis of variance (ANOVA) to determine whether differences in hypnotizability existed among the groups. When this proved negative, the experimenter initiated the treatment phase of the study. (The composition of the groups and the ANOVA can be found in Chapter IV.)

Treatments

As mentioned above, the four treatment groups in the study were the no treatment group, the hypnotherapy group, the coaching group run by the experimenter, and the coaching group run by the dietician at the dialysis center. The no treatment group has been described already. The hypnotherapy and coaching treatments are described below.

Hypnotherapy

The hypnotherapy group received ten weekly sessions of hypnotherapy provided by the experimenter. Each subject was seen individually while receiving his/her dialysis treatment. The experimenter met regularly for supervision throughout the research project with the hypnosis consultant. The major clinical aim of the hypnotherapy was to foster attitudes of mastery and control among the

subjects, and to engage them in efforts to adhere to their medical regimen.

While each subject was treated individually, and treatment strategies varied accordingly, the experimenter's basic procedures for each hypnotic session were the same: (1) pre-hypnotic interview; (2) induction of hypnotic trance; (3) deepening of trance; (4) therapeutic suggestions; (5) awakening; (6) post-hypnotic interview. A detailed description of the treatment is located in Appendix B.

Most sessions were thirty to forty minutes long. From the eighth to tenth sessions, some time was spent in each session discussing termination of the treatment relationship.

At no time did the experimenter review the subjects' medical charts to see how well they are adhering to the dietary and fluid restrictions of their regimen, but the subjects' self-report of their compliance was discussed each session.

Coaching Treatments

Subjects in both coaching treatments also received ten weekly, individualized sessions from either the professional dietician at the Chicago Kidney Center, or from the experimenter himself. The goal of the coaching treatment was to provide encouragement and information to subjects in a systematic fashion to help them adhere more closely to their dialysis regimen.

For two months prior to the treatment, the experimenter met weekly with the dietician to discuss the dialysis regimen and plan the coaching treatment. The three criteria of compliance to be observed (fluid weight gain, potassium, and BUN) were discussed at length, and

routine dietician interventions were explained to the experimenter. The components of the systematic coaching treatment were the following: (1) education; (2) the laboratory reports; (3) discussion and encouragement. A detailed description of the coaching treatment can be found in Appendix B.

The experimenter did not review the subjects' medical charts during the treatment phase, except to go over the monthly chemistries. This was done twice, the first week of May and the first week of June. The dietician did not review the charts more often than is required as a part of her job: typically about once a month. During sessions eight through ten, the experimenter spent some part of each session discussing the end of the treatment relationship. For the dietician, this was deemed unnecessary since she is at the disposal of patients who wish to meet with her. She did explain to each subject, however, that she would no longer be meeting with him/her each week unless it was requested.

Design of the Study

The research was primarily intended to test the effectiveness of different treatments on the three dependent measures. The design of the research was twofold: (1) a pretest/posttest experimental control design, which allowed for analysis of the effects of the treatments on the pre- and posttest measures of anxiety, locus of control, and compliance; and (2) a split plot, repeated measures design, which enabled the experimenter to observe and analyze the effects of the treatments on compliance over time throughout the study.

Subjects were matched for locus of control, compliance, and

hypnotizability, and then randomly assigned to one of the four treatment groups. Additional controls (Internal and compliant subjects) were also used for further comparisons among groups.

Statistical Analysis

Data for the dependent measures of anxiety and locus of control were in the form of pretest and posttest measures. As mentioned earlier, the periodic nature of the compliance data allowed for thrice-weekly observations of the weight-gain measures. As a result, an ongoing evaluation of the effectiveness of the treatments on compliance was available, as well as the before-after perspective. The individual compliance criteria data were analyzed along with the composite compliance measures.

To determine the effectiveness of the treatments, and to examine the relationships among the selected independent variables and the dependent measures, two broad null hypotheses were tested:

(1) There are no significant differences among treatment groups across compliance, locus of control, or anxiety scores.

(2) There are no significant relationships among selected independent variables (age, sex, educational level, length of time on dialysis, hypnotizability) and compliance, locus of control, or anxiety scores.

Due to the nature of the data, a multiplicity of statistical techniques was employed for the analysis. The assumption that the groups were matched was first tested by analyses of variance. The first null hypothesis was tested by analysis of variance and by a repeated measures analysis of variance. The repeated measures

analysis allowed the experimenter to analyze the compliance data across time throughout the treatment phase of the study. The second null hypothesis was tested using multiple regression.

The results of the statistical analysis are discussed in light of the hypotheses and the professional literature. The results appear in Chapter IV.

CHAPTER IV

PRESENTATION AND ANALYSIS OF THE DATA

Introduction

This chapter presents and analyzes the data collected for this experimental study. The chapter is divided into five sections. The first section presents the demographic description of the sample and of each group in the study. It also presents and analyzes the pretreatment data regarding compliance, locus of control, anxiety, and hypnotizability. The second section of this chapter presents the main analysis of the study. It provides analyses pertaining to the first research hypothesis regarding the effectiveness of the treatments on compliance. The third section presents analysis regarding the second research hypothesis, i.e. pertaining to the effectiveness of the coaching treatments. The fourth section of the chapter analyzes data regarding the third and fourth hypotheses, i.e. concerning locus of control and anxiety. The final section pertains to the relationships among the selected independent and dependent variables. The findings presented in this chapter will be summarized again, and their implications will be discussed in Chapter V of this study.

Section 1

This section describes the demographic composition of the sample and the individual treatment groups in the study. In addition, it analyzes the pretreatment data regarding compliance, locus of control,

anxiety, and hypnotizability.

Table 7 presents the demographic composition of the sample. Note that 68 rather than 72 subjects are included. Four subjects were eliminated from the sample during the course of the treatment phase. One compliant subject died. Two internally-oriented subjects transferred to other dialysis centers, and one subject was eliminated because he was absent for five of the ten treatment sessions of hypnotherapy.

Table 8 provides means and standard deviations of subjects' age, educational level, and length of time on dialysis. Ages ranged from 19 to 74 years; the average patient was approximately 48 years of age. Tables 7 and 8 show that there was little variance in socioeconomic status among the subjects. Ninety-one percent were Black and 94.1% had incomes less than $10,000. Seventy-five percent of the sample had at least some high school education, with the mean educational level attained being tenth grade. Only one subject had completed college, and he was a Caucasian with a Ph.D.! The greatest percentage of subjects (23.6%) had been on dialysis between three and four years. The mean duration of treatment was slightly more than three years, five months.

Table 7

Summary of Demographic Data

N=68	Frequency	Percent
Age		
19-25	5	7.4
26-35	5	7.4
36-45	14	20.6
46-55	26	38.2
56-65	15	22.1
66-74	3	4.4
Sex		
Female	37	54.4
Male	31	45.6
Race		
Black	62	91.2
White	4	5.9
Hispanic	2	2.9
Educational Level		
Less than 8th grade	8	11.8
8th grade	9	13.2
Some high school	32	47.1
Completed high school	13	19.1
Some college	5	7.3
Completed college	1	1.5
Income Level		
1. $0-5,000	41	60.2
2. $5,000-10,000	23	33.8
3. $10,000-15,000	1	1.5
4. $15,000-20,000	1	1.5
5. $20,000-30,000	1	1.5
6. $30,000-50,000	0	0
7. $50,000+	1	1.5
Time on Dialysis		
12 months or less	10	14.7
13-18 months	5	7.4
19-24 months	1	1.5
25-36 months	13	19.1
37-48 months	16	23.6
49-60 months	10	14.7
61-72 months	5	7.4
73-84 months	3	4.4
More than 7 years	5	7.4

Table 8

Means and Standard Deviations of Age, Education, and Time on Dialysis

N = 68	Mean	Standard Deviation
Age	47.89 yrs.	11.76
Educational Level	10.05 yrs.	2.62
Time on Dialysis	41.22 months	25.31

Table 9 provides the demographic description of the four treatment groups in the purposive sample, as well as the groups of internally-oriented and compliant subjects. Note that eight of the ten internals are male, and that all the compliant patients are female. Further analysis regarding sex and the dependent variables appears in Section 5 of this chapter. Within the purposive sample, patients in the experimenter's coaching group had been on dialysis for an average of over four years, while patients in the hypnosis group averaged less than two and a half years of treatment. However, one way analysis of variance among the four treatment groups in the select sample, as illustrated in Table 10, reveals no significant differences in time on dialysis among groups.

Table 9

Composition of the Treatment and Control Groups

Group	N	Age	Sex M	Sex F	Race B	Race W	Race H	Education (Years)	Time on Dialysis (months)
Hypnosis	12	47.75 (11.23)	6	6	12	0	0	10.25 (2.8)	29.42 (22.54)
Coaching (Dietician)	13	46.85 (13.55)	6	7	11	1	0	11.0 (3.72)	36.0 (19.27)
Coaching (Experimenter)	13	46.38 (9.56)	8	5	13	0	0	9.38 (1.66)	51.53 (29.49)
No Treatment	13	51.92 (10.28)	3	10	12	1	0	9.38 (2.81)	47.23 (28.39)
Internals	10	48.9 (14.46)	8	2	7	2	1	10.1 (2.23)	41.8 (24.1)
Compliants	7	44 (13.33)	0	7	7	0	0	10.43 (1.40)	40.0 (24.74)

Note: Standard deviations in parentheses.

Table 10

Analysis of Variance of Time on Dialysis Among Treatment Groups in the Select Sample

Source	DF	SS	MS	F	P
Among	3	3879.70	1293.73	2.02	0.12
Within	47	30156.45	641.62		
Total	50				

As mentioned in Chapter III, once the purposive sample was selected on the basis of externality and noncompliance, subjects were randomized into three treatment groups and a no treatment control group. The hypnosis group and the two coaching groups were then administered the modified version of the Stanford Hypnotic Clinical Scale for Adults (SHCS:Adult). Scores on the scale range from 0 to 5. Tables 11 and 12 show the distribution of high, medium, and low hypnotizability scores and the one way analysis of variance (ANOVA) of hypnotizability among the three groups.

Table 11

Distribution of Scores on SHCS: Adult, Among the Three Treatment Groups

Group	N	Mean	Highs (4-5)	Mediums (3-2)	Lows (0-1)
Hypnosis	12	2.58	4	5	3
Coaching (Dietician)	13	2.69	3	8	2
Coaching (Experimenter)	13	2.62	4	6	3

Table 12 shows no significant differences among the groups. One subject in the dietician's group and one subject in the hypnosis group scored 0 on the hypnotizability scale. For the subject in the hypnosis group, this is important since his treatment required some level of hypnotizability in order to be effective.

Table 12

Analysis of Variance of Hypnotizability Among the Three Experimental Treatment Groups

Source	DF	SS	MS	F	P
Among	2	0.079	0.039	0.02	0.97
Within	35	58.76	1.678		
Total	37				

The mean score for the 38 subjects tested for hypnotizability was 2.63 (S.D. = 1.26). This score is indicative of medium hypnotizability on the SHCS: Adult. The normative mean for the scale is 2.75.

Table 13 presents the mean pretreatment compliance values of the sample (N=68), and indicates the levels of compliance on the Kaplan-DeNour and Czaczkes (1972) scale to which each value corresponds. While the subjects exhibited excellent potassium compliance, they were mildly noncompliant with the protein restrictions (as seen in their BUN level), and they were severely abusive of the fluid restrictions of the regimen, as evidenced by their weight gain noncompliance. The level of their overall compliance, which is very poor, is a result of their poor weight-gain adherence. The Kaplan-DeNour and Czaczkes Scale yields a composite score based on the poorest level of compliance among the three criteria. Research studies which report a composite rate of compliance are most likely providing the weight-gain compliance rate, because the fluid restrictions are the most difficult for patients to follow. That is clearly the case in the present study.

Table 13

Mean Scores and Corresponding Adherence Levels of the Pretreatment Compliance Values (N=68)

Compliance Measure	Mean	S.D.	Level of Compliance (1-10)
Overall Compliance	5.53	1.5	6 severe abuse
Weight Gain	5.56 lbs.	1.57	6 severe abuse
Potassium	5.23 mEq/L.	0.84	1 excellent compliance
Bun	99.79%	19.15	4 some abuse

The mean locus of control score among the sample was 10.53 (S.D.=3.37). This indicates that the sample was an externally-oriented group in general, a fact consistent with the dialysis compliance literature (Poll and Kaplan-DeNour, 1980).

The average score on Bendig's Short Form of the Manifest Anxiety Scale was 7.14 (S.D.=4.16). This score is higher than the normative mean of the scale (5.65, S.D.=3.74), but not significantly so.

Section 2

The data presented in this section pertain to the first research hypothesis: "Subjects receiving hypnotherapy will evidence greater improvement in compliance than all other groups in the study." Compliance was reported and analyzed in two ways: as a composite score between one and ten on the modified version of the Kaplan-DeNour and Czaczkes (1972) compliance scale; and as individual values of the three compliance components--weight-gains between dialysis (WG), serum

potassium (K), and blood urea nitrogen (BUN).

Pre- and Posttreatment Analyses

To analyze the effects of the treatments on compliance, it was first necessary to test the pretreatment equivalence of the groups regarding compliance. Table 14 provides the pretreatment compliance data for the treatment and control groups, and Table 15 shows the results of the one way analysis of variance (ANOVA) of the equivalence of the four select groups regarding overall compliance.

Table 15 reveals that the groups were indeed equivalent regarding compliance prior to the treatment phase of the study. Table 14 reveals that, with the exception of the compliants, each group was severely abusive of the medical regimen (see Appendix A), and that compliance scores parallel each group's weight-gain values. While all groups evidence excellent potassium compliance, all except the compliants were somewhat abusive of the protein restrictions of the regimen, as demonstrated by their BUN levels.

Table 14

Pretreatment Compliance Means and Standard Deviations of the Treatment and Control Groups

Group	N	Compliance	SD	Weight Gain (lbs.)	SD	Potassium (mEq/L.)	SD	BUN (mg%)	SD
Hypnosis	12	5.92	1.38	5.90	1.61	5.07	0.83	97.37	14.93
Coaching (Dietician)	13	5.54	0.97	5.61	0.86	5.28	0.91	95.55	14.24
Coaching (Experimenter)	13	5.69	1.32	5.78	1.44	5.31	0.90	108.02	24.49
No Treatment	13	5.85	1.14	5.79	1.17	5.29	0.95	100.18	18.90
Internals	10	6.20	1.81	6.21	2.01	5.47	.81	107.07	21.95
Compliants	7	3.0	0	3.07	.24	4.78	.42	85.47	10.94

Table 15

One Way ANOVA Test of the Pretreatment Equivalence of the Four Treatment Groups in the Select Sample Regarding Overall Compliance

Source	DF	SS	MS	F	P
Among	3	1.08	0.36	0.25	0.87
Within	47	66.61	1.46		
Total	50	67.69			

Table 16 presents the posttreatment compliance data for each group in the study. As a partial test of the hypothesis that hypnotherapy was the most effective treatment in improving compliance, a simple comparison of compliance means in Tables 14 and 16 is useful. The average compliance in the hypnosis group did not improve, and the group moved into a worse compliance category, i.e. the sixth. While the compliance change was sufficient to warrant a worse score on the compliance scale, it was not significantly worse than the other groups. Table 17 provides the one factor ANOVA of the posttreatment composite compliance means among the four treatment groups in the select sample. No significant differences exist; thus, the groups were equivalent regarding overall compliance.

Table 16

Posttreatment Compliance Means and Standard Deviations of All Groups

Group	N	Compliance	SD	Weight Gain (lbs.)	SD	Potassium (mEq/L.)	SD	BUN (mg%)	SD
Hypnosis	12	6.25	1.66	6.18	1.83	4.85	.59	100.2	15.66
Coaching (Dietician)	13	5.07	1.04	5.09	1.01	5.37	.97	89.18	13.29
Coaching (Experimenter)	13	5.54	1.13	5.52	1.29	5.21	.62	99.76	22.12
No Treatment	13	5.85	1.14	5.96	1.31	5.34	.83	100.55	21.41
Internals	10	6.20	1.69	6.34	1.80	5.34	.73	103.79	21.40
Compliants	7	3.71	0.49	3.79	0.50	4.97	.26	82.17	15.22

Table 17

One Way ANOVA Test of the Posttreatment Equivalence of the Four Select Treatment Groups Regarding Overall Compliance

Source	DF	SS	MS	F	P
Among	3	9.24	3.08	1.95	.14
Within	47	74.1	1.58		
Total	50	83.33			

Further testing of the first hypothesis required analysis of whether the individual components of adherence, i.e. weight-gains, potassium, and BUN, changed differentially among the treatment groups. Table 18 provides the one way ANOVA test of the pretreatment equivalence of the four select treatment groups regarding weight gain adherence.

Table 18

One Way ANOVA of the Pretreatment Equivalence of the Four Select Treatment Groups Regarding Weight-Gain Compliance

Source	DF	SS	MS	F	P
Among	3	.54	.18	11	.96
Within	47	78.55	1.67		
Total	50	79.10			

Having established that the groups were equivalent before the treatment phase, a one way posttreatment ANOVA was performed to test for differential improvement among the groups. Table 19 presents that one way ANOVA, which reveals no significant differences. Again, the hypnosis group did not evidence greater improvement than the other groups.

Table 19

One Way ANOVA of the Posttreatment Equivalence of the Treatment Groups Regarding Weight-Gain Compliance

Source	DF	SS	MS	F	P
Among	3	8.89	2.96	1.56	.22
Within	47	89.33	1.9		
Total	50	98.22			

Next, the question of whether the hypnosis group showed greater improvement in potassium adherence was considered. Table 20 presents the results of the one factor ANOVA test of the pretreatment equivalence of the four select groups regarding potassium adherence (refer to Table 14 for the means).

Table 20

One Way ANOVA of the Pretreatment Equivalence of the Four Select Treatment Groups Regarding Potassium Adherence

Source	DF	SS	MS	F	P
Among	3	.49	.16	.20	.90
Within	47	38.14	.81		
Total	50	38.62			

Since the groups were equivalent prior to the treatment phase, a one way posttreatment ANOVA test would reveal any differences among the groups due to the treatments. While a comparison of group means in Tables 14 and 16 shows that the hypnosis group reduced its potassium levels further than the other groups (-.22 mEq/L.), Table 21 indicates that the difference was not statistically significant.

Table 21

One Way Posttreatment ANOVA of the Equivalence of the Four Treatment Groups Regarding Potassium Compliance

Source	DF	SS	MS	F	P
Among	3	2.17	.72	1.22	.32
Within	47	27.88	.59		
Total	50	30.05			

All groups evidenced excellent potassium compliance prior to the treatment. If significant differential change had occurred in potassium adherence, it would most likely have been the result of a decrease in compliance among one or more of the groups.

To test for improvement in BUN adherence, the same procedure was employed. Table 22 shows that the groups were indeed equivalent in BUN compliance prior to the treatments.

Table 22

One Way Pretreatment ANOVA Test of the Equivalence of the Four Treatment Groups Regarding BUN Adherence

Source	DF	SS	MS	F	P
Among	3	1170.41	390.14	1.12	.36
Within	47	16369.85	348.29		
Total	50	17540.26			

Table 23 provides the results of the one way ANOVA test of the posttreatment equivalence of groups in BUN compliance. It reveals that the groups did not differ after the treatments either, so again, the groups were equivalent regarding BUN compliance. Hypnosis was not more effective in improving BUN adherence than the other groups.

Table 23

One Way Posttreatment ANOVA of the Equivalence of the Four Select Treatment Groups Regarding Bun Adherence

Source	DF	SS	MS	F	P
Among	3	1174.88	391.63	1.14	.35
Within	47	16191.59			
Total	50	17366.47			

The first hypothesis stated that hypnotherapy would show greater compliance improvement than all the treatment groups in the study, not simply the three other groups in the purposive sample. Tables 24, 25, 28, and 29 present one factor ANOVA tests of the pretreatment equivalence of all six groups regarding overall compliance, weight-gains, potassium, and BUN. Tables 24 and 25 reveal that the groups were not equivalent before the treatment phase of the study with regard to overall compliance and weight-gain compliance. This can be understood by a glance back at Table 14, which shows that the compliance and weight-gain values of the compliant group were substantially lower than the other groups in the study. To establish this fact further, Duncan Multiple Range tests were performed on both of these compliance criteria. Tables 26 and 27 present the results of these post hoc tests. They reveal that the compliant subjects were significantly more compliant than the other five groups regarding overall compliance and fluid adherence.

Table 24

One Way ANOVA Test of the Pretreatment Equivalence of the Six Groups Regarding Overall Compliance

Source	DF	SS	MS	F	P
Among	5	52.73	10.54	6.66	.0001*
Within	62	98.21	1.58		
Total	67	150.94			

*Significant at .0001 level

Table 25

One Way ANOVA of the Pretreatment Equivalence of the Six Groups Regarding Weight-Gain Adherence

Source	DF	SS	MS	F	P
Among	5	50.31	10.06	5.40	.0003*
Within	62	115.45	1.87		
Total	67	165.76			

*Significant at .001 level

Table 26

Results of the Post Hoc Test* of the Pretreatment Equivalence of the Groups Regarding Overall Compliance

Group	N	Mean (1-10)	Grouping
Internals	10	6.2	A
Hypnosis	12	5.92	A
No Treatment	13	5.85	A
Coaching (Experimenter)	13	5.69	A
Coaching (Dietician)	13	5.54	A
Compliants	7	3.0	B

(Means with the same letter are not significantly different.)
*Duncan Multiple Range Test

Table 27

Results of the Post Hoc Test* of the Pretreatment Equivalence of the Groups Regarding Weight-Gain Compliance

Group	N	Mean	Grouping
Internals	10	6.21 lbs.	A
Hypnosis	12	5.9 lbs.	A
No Treatment	13	5.79 lbs.	A
Coaching (Experimenter)	13	5.78 lbs.	A
Coaching (Dietician)	13	5.61 lbs.	A
Compliants	7	3.07 lbs.	B

(Means with the same letter are not significantly different.)
*Duncan Multiple Range Test

Table 28

One Way ANOVA Test of the Pretreatment Equivalence of the Six Groups Regarding Potassium Compliance

Source	DF	SS	MS	F	P
Among	5	2.47	.49	.68	.64
Within	62	45.12	.73		
Total	67	47.60			

Table 29

One Way ANOVA Test of the Pretreatment Equivalence of the Six Groups Regarding BUN Adherence

Source	DF	SS	MS	F	P
Among	5	3150.82	630.16	1.82	.121
Within	62	21426.04	345.58		
Total	67	24576.86			

Tables 28 and 29 indicate that all six groups were equivalent regarding potassium and BUN adherence prior to the treatments. All groups had excellent potassium compliance. Regarding BUN adherence, however, only the compliant subjects scored in the compliant range on Kaplan-DeNour and Czaczkes' scale, as seen in Table 30. Table 29 indicates that the compliant subjects' BUN level was not statistically different from the other groups however.

Table 30

Baseline BUN Levels of the Six Groups and Their Corresponding Compliance Scores

Group	BUN Mean (mg.%)	Compliance Level (1-10)	
Compliants	85.47	3	compliant
Coaching (Dietician)	95.55	4	some abuse
Hypnosis	97.37	4	some abuse
No Treatment	100.18	4	some abuse
Internals	107.07	4	some abuse
Coaching (Experimenter)	108.02	4	some abuse

To test for differential changes in overall compliance and weight-gain adherence as a result of the treatments, simple analysis of variance and Duncan Multiple Range tests were employed. Tables 31 and 32 demonstrate that the groups were different regarding these criteria after the treatments, but Tables 33 and 34 show that the

Table 31

One Way ANOVA Test of the Posttreatment Equivalence of the Six Groups Regarding Overall Compliance

Source	DF	SS	MS	F	P
Among	5	37.74	7.55	4.63	.001
Within	62	101.12	1.63		
Total	67	138.86			

*Significant at .001 level

Table 32

One Way ANOVA Test of the Posttreatment Equivalence of the Six Groups Regarding Weight-Gain Adherence

Source	DF	SS	MS	F	P
Among	5	37.68	7.54	3.89	.004
Within	62	120.18	1.94		
Total	67	157.86			

*Significant at .005 level

Table 33

Results of the Post Hoc Test* of the Posttreatment Equivalence of the Six Groups Regarding Overall Compliance

Group	N	Mean (1-10)	Grouping
Internals	12	6.25	A
Hypnosis	10	6.20	A
No Treatment	13	5.85	A
Coaching (Experimenter)	13	5.54	A
Coaching (Dietician)	13	5.07	A
Compliants	7	3.71	B

(Means with the same letter are not significantly different.)
*Duncan Multiple Range Test

Table 34

Results of the Post Hoc Test* of the Posttreatment Equivalence of the Six Groups Regarding Weight-Gain Adherence

Group	N	Mean	Grouping
Internals	10	6.34 lbs.	A
Hypnosis	12	6.18 lbs.	A
No Treatment	13	5.96 lbs.	A
Coaching (Experimenter)	13	5.52 lbs.	A
Coaching (Dietician)	13	5.09 lbs.	A
Compliants	7	3.79 lbs.	B

(Means with the same letter are not significantly different.)
*Duncan Multiple Range Test

differences were only due to the behavior of the compliant subjects. These tests confirm the earlier findings that the hypnosis group was not more effective in improving compliance than the other groups in the study.

Table 35 provides the one way posttreatment ANOVA of the potassium compliance of the six groups. Again, while the hypnosis patients evidenced greater improvement in potassium adherence than the other five groups, that difference was not statistically significant. Moreover, the potassium compliance of the entire sample remained excellent throughout the study (see Table 16 and Appendix A).

Table 35

One Way ANOVA Test of the Posttreatment Equivalence of the Six Groups Regarding Potassium Adherence

Source	DF	SS	MS	F	P
Among	5	2.72	.54	1.02	.42
Within	62	33.16	.53		
Total	67	35.88			

Table 36 presents the results of the post treatment, one way ANOVA of the BUN adherence of the six groups. Again, no group showed significantly greater improvement than any other group.

Table 36

One Way ANOVA Test of the Posttreatment Equivalence of the Six Groups Regarding Bun Compliance

Source	DF	SS	MS	F	P
Among	5	3177.76	635.55	1.82	.12
Within	62	21701.39	35.02		
Total	67	24879.15			

Weekly Analyses of Weight-Gain Adherence

As mentioned in Chapter III, the nature of the weight-gain data allowed for weekly observations of change in this criteria of adherence. In order to gain a more detailed understanding of the effects of the treatments on weight-gain compliance, a one way, multivariate repeated measures design was employed, in which time was the repeated factor. This is a traditional approach to repeated measures analysis. The other factor in the multivariate analysis was treatment group. The one way, multivariate repeated measures analysis of variance (MANOVA) examined each subject in each group for 11 observations (i.e., one observation for the pretreatment mean, and one for each week of the study). The weekly mean values for each group in the study are presented in Table 37 and depicted in Graphs 1 and 2.

One way, repeated measures MANOVAs were run first on the four select treatment groups, and then on all six groups. The results will be presented in that order. The one way repeated measures MANOVAs

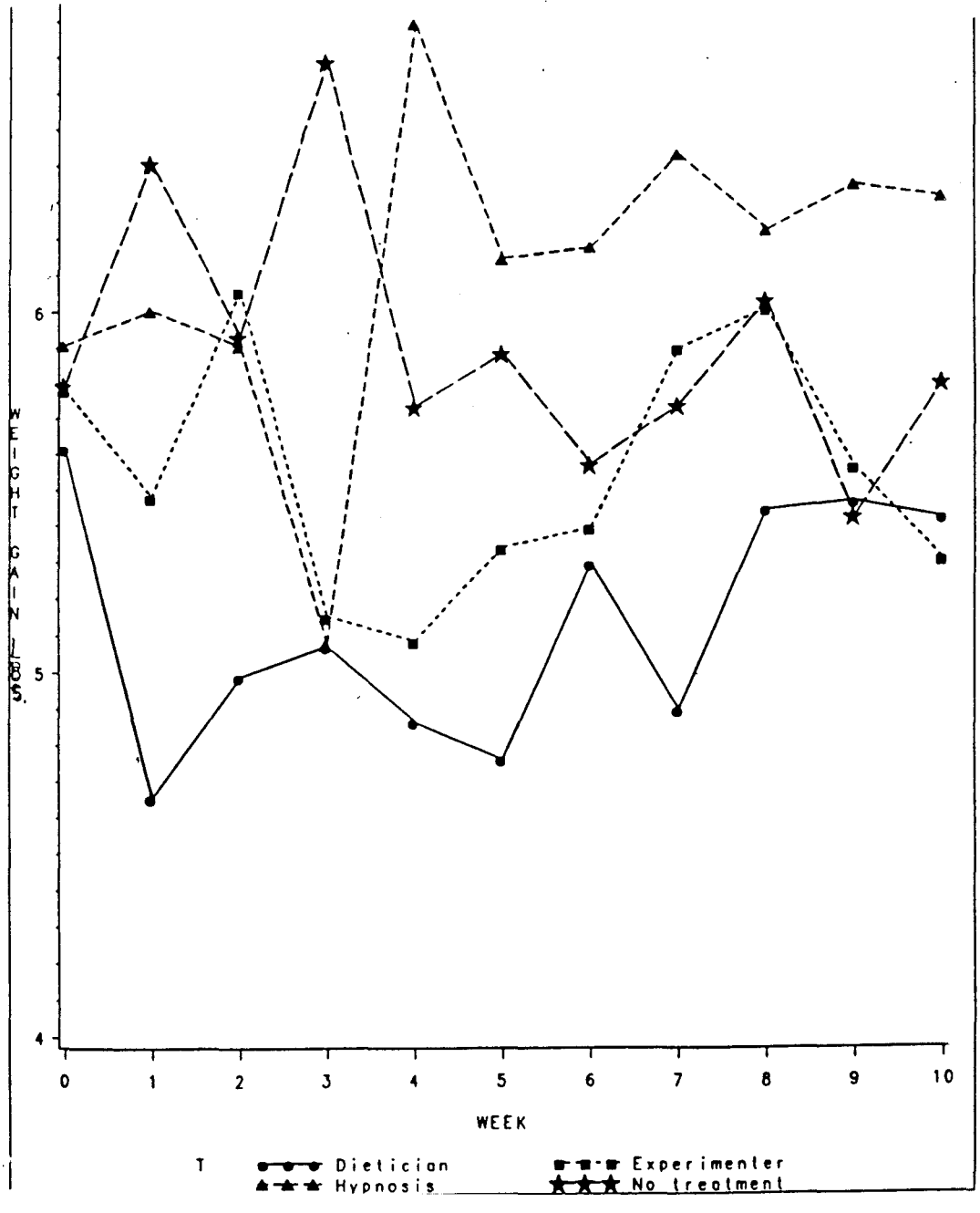
Table 37

Weekly Weight Gain Means for All Groups (in pounds)

	WEEK										
	0	1	2	3	4	5	6	7	8	9	10
Hypnosis	5.90	6.00	5.90	5.08	6.79	6.14	6.18	6.43	6.22	6.35	6.31
Dietician	5.61	4.65	4.99	5.07	4.87	4.76	5.29	4.90	5.44	5.47	5.42
Experimenter	5.78	5.48	6.06	5.15	5.09	5.34	5.40	5.90	6.01	5.56	5.31
No Treatment	5.79	6.40	5.93	6.69	5.73	5.88	5.57	5.74	6.03	5.42	5.80
Internal	6.55	6.22	6.18	6.28	6.54	5.70	7.30	6.47	6.04	5.69	6.33
Compliant	3.10	3.19	3.64	4.08	4.69	3.58	3.30	3.88	3.56	4.09	4.05

Graph 1

Weight Gain Over Time
(Four Groups in Purposive Sample)



yielded main effects for treatment group and time, and a time x treatment interaction effect. In addition to the multivariate analyses, univariate analyses of variance (ANOVAs) were run on the weekly group means, and the results of those ANOVAs are summarized in Tables 38 and 39.

The overall treatment effect, i.e., whether or not differences exist among the four groups, was significant [multivariate F(33, 114 d.f.) = 1.74, p = .017]. This indicates that the groups did not have the same average weight-gain over the course of the study. Graph 1 provides a view of the weekly weight-gain changes of the four groups. Table 38 reveals that while the groups' pretreatment weight-gains were equivalent, i.e., at Week 0, they immediately showed marginal differences at Week 1, when the dietician's coaching group evidenced marked improvement and the no treatment controls became more noncompliant. Things evened out at Week 2 when the dietician's group became worse while the controls improved. Week 3 showed the greatest effectiveness of the experimental treatments. As seen in the Graph, the hypnosis group and the experimenter's coaching group showed marked improvement while the control subjects reached their poorest level of compliance. The treatment groups were significantly more compliant than the controls at this point (Table 38), but, as the graph illustrates, the hypnosis subjects were not more compliant than the coaching subjects.

Table 38

Summary of the Results of One Way Analyses of Variance of Weekly Weight-Gains of the Four Select Groups

Week	F-ratio (3,49 d.f.)	P
0	.11	.96
1	2.57	.65
2	.70	.55
3	3.12	.034*
4	3.52	.022*
5	2.09	.11
6	.38	.77
7	1.92	.14
8	.40	.76
9	.58	.63
10	.99	.41

*Significant at .05 level

Week 4 brought a remarkable turnaround for the hypnosis subjects, who deteriorated to their worst compliance level of the study. A concomitant regression by the controls, and small improvements by both coaching groups resulted in significant differences among the four groups. None of the subsequent weeks of treatment showed significant differences among the groups, as Table 38 indicates.

The overall treatment effect of the repeated measures MANOVA is not clear at this point. The finding of a treatment effect is different than the results of the pre- and posttreatment analyses of variance of the four groups which appeared in Tables 18 and 19. A comparison of weight-gain means in Tables 14 and 16, and scrutiny of Graph 1 suggest that marginal improvement by the coaching groups and

nonsignificant deterioration among the hypnosis subjects accounts for the overall treatment effect. The repeated measures statistic also has the capacity to take into account the real but nonsignificant differences among the pretreatment means, and follow the differences through the study. Since the coaching groups begin with better weight-gain adherence and then improve further, while the hypnosis subjects get worse, the one way, repeated measures MANOVA was able to pick up the differences among the groups.

The time effect of the multivariate analysis, i.e., the change in weight-gains over time, irrespective of the treatment groups, was not significant [multivariate F (10,37 d.f.) = 96, P = .49). This indicates that the overall weight-gain of the purposive sample did not change significantly over the course of the study. A comparison of Tables 14 and 16 reveals improvements in weight-gain adherence among the coaching groups which were offset by a decrease in fluid compliance by the hypnosis and control subjects.

The interaction effect of time and treatment was significant [multivariate F (30, 117 d.f.) = 1.82, p = .013], indicating that the treatment groups changed over time at different rates. In light of this finding, each group was examined separately by means of simple effects tests, or profile analysis, which compared the weight-gain adherence of a group's nth week with its pretreatment weight-gain level. The results of simple effects tests will be presented following the presentation of the results of the one way, repeated measures MANOVA of all six groups' weight-gain change over time.

The one way, repeated measures MANOVA of the six groups yielded a

significant treatment effect [multivariate F (55, 275 d.f.) = 1.93, p = .0003]. This can be attributed to the presence of the compliant subjects who maintained significantly greater fluid compliance than all other groups throughout the study. Just as with the four select groups, additional univariate ANOVAs were performed on the weekly group means (found in Table 37), and the results of those ANOVAs are summarized in Table 39. Graph 2 depicts the weight-gain changes among all six groups over the course of the treatment. The univariate ANOVAs presented in Table 39 show significant differences among the groups due to the compliant subjects' superior fluid adherence in seven of the ten weeks of treatment. Even during Week 4, when the compliant group was markedly noncompliant, the severe abuse of the hypnosis and internal subjects offset the compliants' poor showing.

Table 39

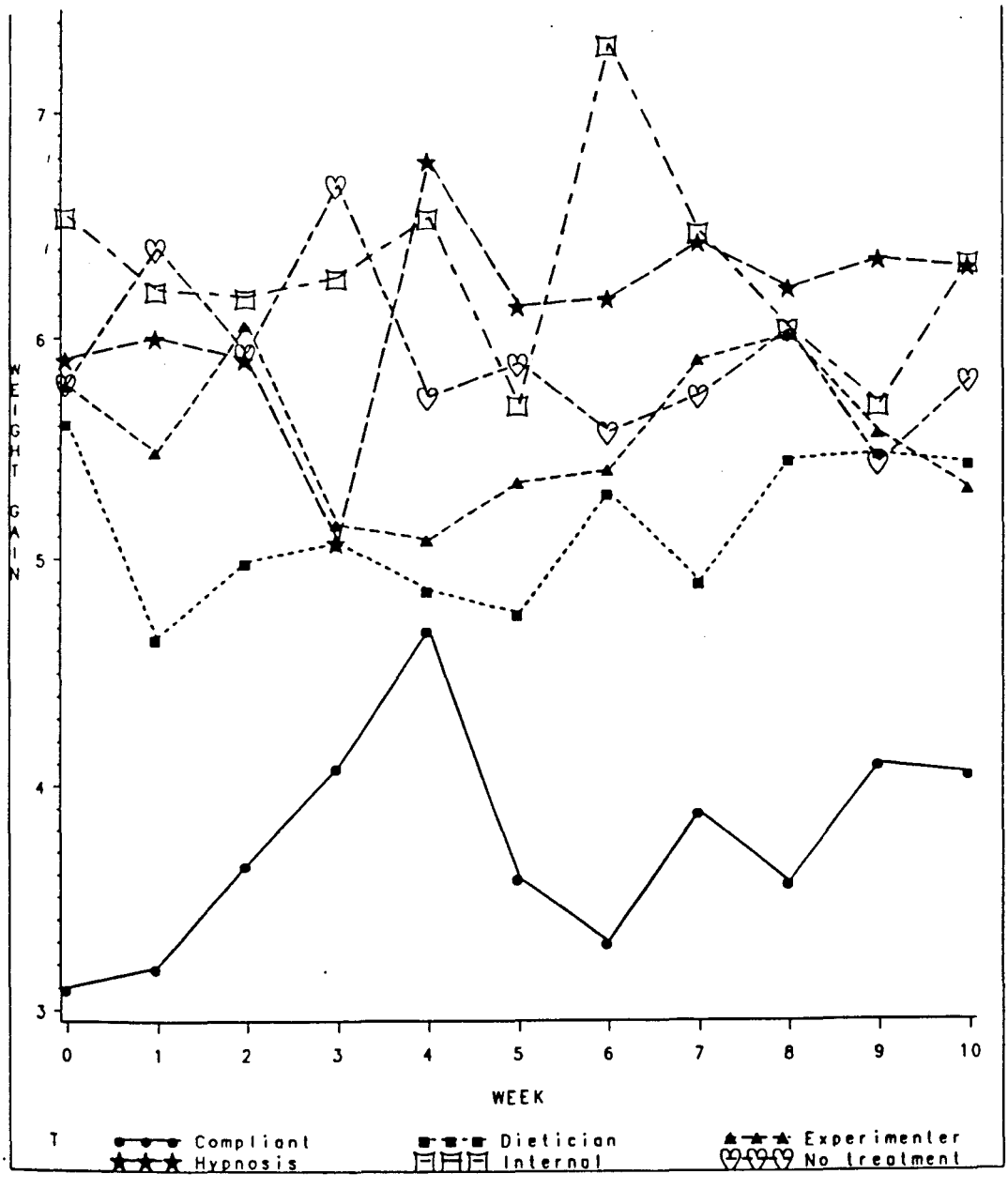
Summary of the Results of the One Way ANOVAs of Weekly Weight-Gains of all Six Groups

Week	F-ratio	P
0	5.30	.0004*
1	5.27	.0004*
2	2.02	.09
3	2.53	.038[a]
4	2.56	.036[a]
5	3.07	.016[a]
6	3.27	.01+
7	3.20	.01+
8	2.31	.054
9	1.24	.30
10	2.47	.04[a]

*Significant at .001 level.
+Significant at .01 level.
[a]Significant at .05 level.

Graph 2

Weight Gain Over Time
(For Six Groups)



The time effect of the multivariate analysis was not significant [multivariate F (10, 52) = 1.12, p = .036]. Again, the sample's overall weight-gain did not change much over the course of the study (the entire sample gained .02 lbs.).

The interaction effect of time and treatment was significant [multivariate F (50, 280 d.f.) = 1.68, p = .005], meaning that the weight-gain compliance of the six groups changed over time at different rates. As mentioned above, simple effects tests were performed to illuminate the changes in fluid adherence within each group over the course of the treatment. The results of those tests are presented here.

Results of the Simple Effects Tests For Each Group

As mentioned, simple effects tests, or profile analyses were computed on each group's weekly weight-gain values (found in Table 37), in order to illuminate the pattern of weight-gain change over time. First, one way, repeated measures MANOVAs were run with time as the repeated factor, in order to test whether or not there was change in weight-gain over time. Then, profile analyses contrasted each group's weekly values with its pretreatment mean value. One way ANOVAs were performed on the contrast variables to test for significant differences between each week's mean and the baseline level.

Hypnosis Group

The one way, repeated measures MANOVA for the hypnosis subjects yielded a marginal effect for time [multivariate F (10, 2) = 16.23, p = .059], indicating that the group evidenced some change in

weight-gain over the course of the study. Table 40 summarizes the results of the simple effects trests, or the one way ANOVAs of the planned contrasts for the hypnosis group.

Table 40

Summary of the One Way ANOVA Tests of the Planned Contrasts For The Hypnosis Subjects

Week	F-ratio	P
1	.07	.79
2	.00	.99
3	5.51	.038+
4	14.96	.003*
5	.78	.40
6	.48	.50
7	1.12	.31
8	.68	.42
9	.66	.43
10	1.03	.33

*Significant at .005 level.
+Significant at .05 level.

As can be seen from the table and from Graphs 1 and 2, the hypnosis subjects showed significant changes in fluid adherence during Weeks 3 and 4. At Week 3, their weight-gain compliance was significantly better than their pretreatment adherence. But the following week, their fluid adherence jumped to its worst level of the entire study, significantly worse than their pretreatment mean. During the remainder of the study, their weight-gain level was not significantly different from their baseline level; but as the graphs illustrate, they never completely recovered from their fluid binging

of Week 4. They never returned to their pretreatment level of compliance.

Dietician's Coaching Group

Table 41 provides the simple effects tests results for the dietician's group. The main effect of time of the repeated measures MANOVA was not significant [multivariate F (10, 3) = 6.78, p = .071], but the p-value suggested some change in weight-gain compliance over the course of the treatment phase. Table 41 and the graphs reveal that in Weeks 1, 4, 5, and 7, this coaching group evidenced significantly lower fluid compliance than their baseline level. The graphs also show that while there was a return toward the mean during Weeks 8, 9, and 10, this group remained below their baseline levels during the entire treatment phase.

Table 41

Summary of the One Way ANOVA Tests of the Planned Contrasts For The Dietician's Coaching Group

Week	F-Ratio	P
1	8.53	.01+
2	3.05	.11
3	1.94	.19
4	6.53	.025+
5	10.66	.007*
6	.81	.39
7	5.14	.04+
8	.19	.67
9	.14	.71
10	.42	.53

*Significant at .01 level.
+Significant at .05 level.

Experimenter's Coaching Group

The results of the simple effects tests for the experimenter's group are presented in Table 42. There was a marginal time effect for the group [multivariate F (10, 3) = 17.76, p = .054]. Table 41 shows that during Week 4, this group's fluid adherence was significantly different from their pretreatment level. Graph 1 reveals that they improved their compliance during Weeks 3 and 4, but could not maintain their reduced fluid intake. They evidenced a four week climb to their worst noncompliance at Week 8, before returning to improved levels in Weeks 9 and 10. Only during Week 4, however, did these subjects attain significantly lower fluid compliance than their baseline level, as seen in Table 42.

Table 42

Summary of the One Way ANOVA Tests of the Planned Contrasts For The Experimenter's Coaching Group

Week	F-Ratio	P
1	.71	.42
2	.63	.44
3	3.32	.095
4	10.75	.007*
5	2.30	.16
6	.53	.48
7	.06	.81
8	.68	.43
9	.17	.68
10	1.56	.23

*Significant at .01 level.

No Treatment Controls

The main time effect of the multivariate analysis of 10 weeks of weight-gain adherence for the control subjects was not significant [multivariate F (10, 3) = 1.13, p = .52]. Therefore, it is concluded that these subjects evidenced no significant change in weight-gain compliance over the course of the treatment. The simple effects tests are similarly nonsignificant, so they are not presented. The group evidenced variability in fluid adherence during the treatment phase, as seen in Graphs 1 and 2, but none of the weekly changes were significantly different from their baseline level.

Internals

This group had only 10 subjects. This precluded multivariate analysis, due to insufficient degrees of freedom. Thus, a univariate repeated measures ANOVA was run to test for changes in weight-gain over time. The results were not significant (F = 1.34, p = .25) which suggested that the group did not vary its weight-gain level during the treatment phase. However, the simple effects tests contrasting each week with the pretreatment weight-gain level, presented in Table 43, reveal that during Week 6, the internals' weight-gain level was significantly different than their baseline level.

Table 43

Summary of the One Way ANOVA Tests of the Planned Contrasts For The Internally-Oriented Subjects

Week	F-Ratio	P
1	.00	.99
2	.01	.93
3	.02	.89
4	.45	.51
5	.72	.42
6	7.07	.026*
7	.44	.52
8	.23	.64
9	.84	.38
10	.09	.76

*Significant at .05 level.

Graph 2 shows that the internals were extremely noncompliant during the sixth week, reaching the poorest level of fluid compliance of all groups during the entire study. The graph also shows that these subjects started and finished the study at least tied for the worst fluid compliance of all groups. More will be said below about locus of control and compliance among subjects in this study.

Compliant Subjects

With only seven subjects in this group, multivariate analysis was not possible, so univariate repeated measures analysis of variance was run to test for change in weight-gain over time. The results were not significant ($F = 1.56$, $p = .16$), indicating that there were not significant changes in weight-gain over time. However, as can be seen in Graph 2, the fluid compliance of this group varied a great deal

during the 10 weeks. The simple effects tests results in Table 44 indicate that at Weeks 4 and 9, there were significant differences from their baseline level. Graph 2 reveals that the compliant subjects' fluid levels began to deteriorate from the first week on, and never returned to baseline levels during the study.

Table 44

Results of Simple Effects Tests of the Compliant Subjects

Week	F-Ratio	P
1	.16	.70
2	1.20	.31
3	3.34	.11
4	26.34	.002*
5	1.47	.27
6	.75	.42
7	1.86	.22
8	3.30	.12
9	9.97	.02+
10	4.36	.08

*Significant at .005 level.
+Significant at .05 level.

The results of the simple effects tests revealed the improvements and deteriorations in weight-gain compliance among the six groups. It was shown that the hypnosis group was only effective in significantly reducing fluid intake during the third week of treatment; and even then, it was not more effective than the two coaching groups.

Analysis of Pre- and Posttreatment Change For Each Group

The final part of this section concerning the effectiveness of the treatments in improving compliance, provides analysis of the pre- to posttreatment change in each group regarding compliance. T-tests were run on the various compliance criteria for each group. The results are presented in Tables 45-48.

Table 45 reveals that the hypnosis group not only did not improve overall compliance, but actually had a nonsignificant deterioration in compliance. Also notable is the significant breakdown in overall compliance among the (formerly) compliant subjects.

Table 45

Results of T-Tests for Changes in Overall Compliance

Group	N	Mean Pre-Post Change	T-ratio	P
Hypnosis	12	.33	1.77	.10
Coaching (Dietician)	13	-.46	-1.90	.08
Coaching (Experimenter)	13	-.15	-1.0	.34
No Treatment	13	0	0	1.0
Internals	10	0	0	1.0
Compliants	7	.71	3.87	.008*

Note: A positive change means poorer compliance.
*Significant at .01 level.

Table 46 makes clear that it was the increase in fluid intake that accounted for the compliant subjects' deterioration in overall adherence seen in Table 45. Both coaching groups showed improvements in fluid compliance, but these were not statistically significant. The significant deterioration of the compliant subjects and the marginal improvement of the coaching subjects would appear to account for the main treatment effect of the multivariate analysis of the weekly contrasts of weight-gains, cited above.

Table 46

Results of T-Tests for Changes in Weight-Gain Compliance

Group	N	Mean Pre-Post Change (lbs.)	T-Ratio	P
Hypnosis	12	.27	1.22	.24
Dietician's	13	-.52	-2.09	.058
Experimenter's	13	-.26	-1.95	.07
No Treatment	13	.17	.42	.68
Internals	10	.13	.50	.62
Compliants	7	.71	4.39	.005*

Note: Positive change means poorer compliance.
*Significant at .05 level.

Table 47 shows that the hypnosis group had a greater improvement in potassium compliance than all other groups, but the change was not significant even within the hypnosis group itself.

Table 47

Results of T-Tests for Changes in Potassium Compliance

Group	N	Mean Pre-Post Change (mEq/L.)	T-Ratio	P
Hypnosis	12	-.22	-1.55	.15
Dietician's	13	.09	.66	.52
Experimenter's	13	-.10	-.67	.51
No Treatment	13	.05	.35	.72
Internals	10	-.14	-.63	.54
Compliants	7	.19	1.45	.20

Note: Positive change means poorer compliance.
*Significant at .05 level.

Table 48 reveals that the hypnosis subjects had the greatest deterioration in BUN compliance of all the groups, but the change was not statistically significant. The capacity of both coaching groups to improve BUN adherence is made very clear by the table. More discussion of the effectiveness of the coaching groups is found in the next section of this chapter.

Table 48

Results of T-Tests for Changes in BUN Adherence

Group	N	Mean Pre-Post Change	T-Ratio	P
Hypnosis	12	2.83	1.14	.28
Dietician	13	-6.34	-2.31	.039*
Experimenter	13	-8.25	-2.53	.026*
No Treatment	13	.37	.13	.90
Internals	10	-3.28	-1.25	.24
Compliants	7	-3.3	-.70	.51

Note: A positive change means poorer compliance.
*Significant at .05 level.

Summary of Section 2

The various and complex analyses in this section pertained to the first research hypothesis, i.e., that the hypnosis subjects would show greater improvement in compliance than all other groups. This was tested by: (1) pre- and posttreatment analyses of variance of the mean compliance values of the four groups in the purposive sample, and of all six groups; (2) multivariate repeated measures analyses of variance of weight-gains over the ten weeks of the study, both for the purposive sample, and for all six groups; (3) profile analyses, contrasting each group's weekly weight-gains with its pretreatment mean; and (4) t-tests of each group's changes in compliance.

The pre- and posttreatment analyses of variance revealed that the groups in the purposive sample were equivalent in all aspects of compliance before and after treatment. Therefore, hypnosis subjects

did not show greater improvement in compliance than the other groups. The pre- and posttreatment analyses of variance of the six groups, and further analysis with Duncan Multiple Range Tests, showed that the compliant subjects had significantly better overall and fluid adherence than the other five groups before and after the treatments. The hypnosis subjects did not evidence greater improvement in overall or fluid compliance than the other groups. The six groups were equivalent regarding potassium and BUN adherence before and after treatment. Again, the hypnosis subjects did not have significantly greater improvement in these aspects of compliance than the other five groups.

The multivariate repeated measures analyses of variance yielded a significant overall treatment effect among the purposive sample, indicating that the groups did not have the same average weight-gains over the course of the study. However, further analysis of the groups' performance, in Tables 14 and 16 and Graph 1, revealed that the hypnosis group did not evidence greater improvement in weight gains than the other groups. Rather, the treatment effect appeared to result from marginal improvements among the coaching groups combined with nonsignificant deterioration by the hypnosis subjects. The time effect of the multivariate analysis was not significant. The interaction effect of time and treatment was significant, indicating that the four groups' weight-gains changed differently over time. This finding prompted the profile analysis of each group.

The multivariate repeated measures analyses of the six groups yielded a significant treatment effect which was attributed to the

presence of the compliant subjects in the analysis. Again, the hypnosis subjects did not evidence greater improvement in fluid adherence than the other groups. The time effect of the multivariate analysis of the six groups was not significant, indicating that the entire sample's overall weight-gain did not change over the course of the study. The time x treatment interaction effect was significant among the six groups; this was further examined by the profile analysis of each group.

The simple effects tests, or profile analyses, revealed that the hypnosis subjects did not show a significant improvement in weight-gain adherence over the ten weeks of the study. They evidenced significant improvement during the third week which was followed by a significant deterioration during the fourth week. The dietician's coaching group evidenced significantly lower weight-gains during four of the ten weeks. The experimenter's coaching group showed significant improvement during one of the ten weeks. The no treatment control subjects' weight-gains were not significantly different than their pretreatment mean during any of the ten weeks. The internals' weight-gains became significantly worse than their pretreatment mean during one week of the study, and never showed significant improvement during any week. The compliant subjects' weight-gains were significantly worse than their pretreatment mean value during two of the ten weeks of the study, and never significantly better than their pretreatment mean.

The results of the t-tests of each group's changes in compliance revealed that the hypnosis group did not show significant improvement

in overall compliance, fluid compliance, potassium compliance, or BUN compliance. Similarly, the no treatment controls and internal subjects did not have significant change in any aspect of compliance. The coaching groups evidenced no significant change in overall compliance, fluid compliance, or potassium compliance; however, both groups improved significantly in BUN adherence. The compliant subjects had significant deterioration of their overall and fluid adherence. They showed no significant change in potassium or BUN compliance.

Section 3

This section pertains to the second research hypothesis: "Both coaching groups will show greater improvement in compliance than the no treatment control group, the compliant subjects, and the internal subjects." Tables 26 and 27, providing the results of pretreatment post hoc tests regarding overall compliance and weight-gain adherence, illustrate nicely that the coaching groups did not differ in these criteria prior to the treatments. The analyses of variance results depicted in Tables 15, 17, 18, 19, 20, 21, 22, and 23 also make clear that there were no significant differences between the two coaching groups at either pretreatment or posttreatment levels for any of the compliance criteria.

The results of the t-tests for changes in weight gains, depicted in Table 46; and the t-tests results for changes in BUN adherence presented in Table 48 suggest that the coaching groups were more effective in improving compliance than all other groups in the study. The no treatment controls and the internals showed absolutely no

change in overall compliance (see Table 45) while the hypnosis and compliant subjects' compliance degenerated and the hypnosis subjects showed nonsignificant deterioration in compliance.

To further test the hypothesis that the coaching groups showed greater improvement than the control groups, one way analyses of variance of changes in compliance were run. First, to eliminate the variance of the compliant subjects, one way ANOVAs were run on changes in the two coaching groups, the no treatment controls, and the internals. The results of the ANOVAs are summarized in Table 49. The ANOVAs themselves are found in Appendix C. As can be seen, no significant differences exist, so it is concluded that the coaching group was not more effective in improving compliance than the no treatment group or the internals. The significant improvement within each coaching group regarding BUN adherence was not statistically significant when compared to the changes in the no treatment controls and the internals. That is probably because the internals evidenced a mild improvement in BUN also.

Table 49

Summary of the One Factor Analyses of Variance of Changes in Compliance Among the Coaching Groups, The No Treatment Group, and The Internals

Analysis	F-Ratio (3,45 d.f.)	P
Changes in Overall Compliance	.65	.59
Changes in Weight-Gains	1.38	.26
Changes in Potassium	.47	.70
Changes in BUN	1.72	.18

To test the improvements in compliance among the coaching groups against those in the compliant group, one way analyses of variance were employed for all six groups in the study. The results of the ANOVAs are summarized in Table 50. The ANOVAs themselves are in Appendix C.

Table 50

Summary of Results of One Way Analyses of Variance of Changes In Compliance Among All Six Groups

Analysis	F-Ratio (5,62 d.f.)	P
Changes in Overall Compliance	2.10	.077
Changes in Weight-Gains	2.25	.06
Changes in Potassium	.87	.50
Changes in BUN	2.01	.089

Table 50 shows that the differences in changes in overall compliance, fluid compliance, potassium compliance, and BUN compliance among the six groups were not significant. Therefore, the coaching subjects did not evidence significantly greater improvement in compliance than the compliant subjects either. To summarize, then, regarding the effectiveness of the coaching groups versus the control groups: the significant deterioration in fluid compliance among the compliant subjects, combined with the marginal improvement among the coaching groups did not represent significant differences among these groups. Also, the significant improvements in BUN adherence which both coaching groups evidenced were not significantly better than the improvements in the control groups. While the coaching groups were the only groups to show any compliance improvement over the course of the study, statistically, their performance was not significantly different than that of the control groups.

Section 4

This section pertains to the third and fourth hypotheses: a) "Subjects receiving hypnotherapy will show greater change in locus of control than all other groups, and the change will be in an internal direction"; b) "Hypnotherapy subjects will demonstrate greater reduction in anxiety than all other groups."

Two subjects who completed the study, one in the experimenter's coaching group and one in the no treatment control group, did not fill out the instruments measuring locus of control and anxiety at the end of the study. Each subject simply stated that he did "not want to." Both agreed to allow their compliance data to be used in the study.

Their pretests for locus of control and anxiety were not used in the data analysis. Therefore, only 66 subjects' data are included in the analyses for these variables.

Treatments and Locus of Control

Table 51 provides the pretreatment means and standard deviations for locus of control scores for each group in the study. Table 52 gives the results of the one way ANOVA test of the pretreatment equivalence of the four groups in the select sample regarding locus of control.

An inspection of the group means in Table 53 descriptively shows little differences among the groups. The one way ANOVA depicted in Table 54 verifies the finding of no significant differences among the four means, with a p-value of .70. Therefore, it can be concluded that the groups were indeed equivalent regarding locus of control at pretreatment. Table 53 presents the posttreatment means and standard deviations for locus of control scores for all groups. Table 54 gives the results of the one way ANOVA test of the posttreatment equivalence of the four select groups on locus of control.

A comparison of means in Tables 51 and 53 shows very little change in locus of control in any group between pre- and posttreatment. Table 54 confirms that no significant differences exist among the posttreatment means of the four groups. Therefore, it is concluded that the hypnosis subjects did not show greater change than the other groups in locus of control orientation. Indeed, they showed no change at all.

To test for effectiveness in locus of control change among all

Table 51

Means and Standard Deviations of Pretreatment Locus of Control Scores for all Groups in the Study

Group	N	Mean	Standard Deviation
Hypnosis	12	11.25	2.30
Coaching (Dietician)	13	12.15	2.54
Coaching (Experimenter)	12	11.17	1.59
No Treatment	12	12.25	2.35
Internals	10	4.50	2.46
Compliants	7	10.86	1.95

Table 52

One Way ANOVA Test of the Pretreatment Equivalence of the Four Treatment Groups in the Select Sample Regarding Locus of Control

Source	DF	SS	MS	F	P
Among	3	12.14	4.05	.79	.51
Within	45	231.86	5.12		
Total	48	244.00			

Table 53

Means and Standard Deviations of the Posttreatment Locus of Control Scores for all Groups in the Study

Group	N	Mean	Standard Deviation
Hypnosis	12	11.25	2.01
Coaching (Dietician)	13	12.00	2.82
Coaching (Experimenter)	12	11.33	2.19
No Treatment	12	12.25	2.67
Internals	10	4.80	2.15
Compliants	7	11.00	2.00

Table 54

One Way ANOVA Test of Posttreatment Equivalence of the Four Select Groups Regarding Locus of Control

Source	DF	SS	MS	F	P
Among	3	8.83	2.94	.49	.70
Within	45	271.17	6.03		
Total	48	280.00			

six groups, one way analyses of variance and Duncan Multiple Range Tests were employed. Table 55 reveals that the six groups were not equivalent on locus of control, but the Duncan Multiple Range Test results presented in Table 56 show that the differences are only due to the presence of the internals. By definition, the internals were different in locus of control than the other groups. At posttreatment, the situation had not changed significantly. Table 57 presents the results of the one way ANOVA test of the posttreatment equivalence of the groups. Again, they are not equivalent, but as the results of the post hoc test depicted in Table 58 makes clear, the internals remain the only group with a significantly different mean for locus of control. A simple comparison of group means in Tables 56 and 58 reveals very little change between pretreatment and posttreatment in any group. Therefore, the hypnosis group did not show significantly greater improvement than the other groups in the study.

Table 55

One Way ANOVA Test of the Pretreatment Equivalence of the Six Groups on Locus of Control

Source	DF	SS	MS	F	P
Among	5	445.22	89.04	17.28	.0001*
Within	60	309.22	5.15		
Total	65	754.44			

*Significant at .001 level

Table 56

Results of the Post Hoc Test* of the Pretreatment Equivalence of the Six Groups on Locus of Control

Group	N	Mean	Grouping
No Treatment	12	12.25	A
Coaching (Dietician)	13	12.15	A
Hypnosis	12	11.25	A
Coaching (Experimenter)	12	11.17	A
Compliants	7	10.86	A
Internals	10	4.59	B

(Means with the same letter are not significantly different.)
*Duncan Multiple Range Test

Table 57

One Way ANOVA Test of Posttreatment Equivalence of the Six Groups Regarding Locus of Control

Source	DF	SS	MS	F	P
Among	5	407.19	81.44	14.51	.0001*
Within	60	336.77	5.61		
Total	65	743.96			

*Significant at .001 level

Table 58

Results of the Post Hoc Test* of the Posttreatment Equivalence of the Six Groups Regarding Locus of Control

Group	N	Mean	Grouping
No Treatment	12	12.25	A
Coaching (Dietician)	13	12.0	A
Coaching (Experimenter)	12	11.33	A
Hypnosis	12	11.25	A
Compliants	7	11.0	A
Internals	10	4.80	B

(Means with the same letter are not significantly different.)
*Duncan Multiple Range Test

Treatments and Anxiety

The pretreatment means and standard deviations for anxiety scores are presented in Table 59. The means of the six groups do not appear very different. Since the purposive sample was not selected on the basis of anxiety scores, it was possible to immediately test the pretreatment equivalence of all six groups regarding anxiety. The one way analysis of variance of the pretreatment equivalence of the six groups is presented in Table 60. The results indicate that no significant differences exist among the six groups at pretreatment. Therefore, any differences at posttreatment would be attributed to the effects of the groups. The posttreatment means and standard deviations are provided in Table 61. A comparison of means in Tables 59 and 61 reveals differential change among the groups, with the hypnosis group showing the greatest reduction in anxiety among all the groups. The results of the one way analysis of variance test of the posttreatment equivalence of the six groups appears in Table 62. No significant differences among the group means exist. Therefore, it is concluded that hypnosis was not more effective in reducing anxiety than the other groups.

To test for significant anxiety change within each group, t-tests were performed on the changes in anxiety from pre- to posttreatment. The results of the t-tests appear in Table 63. The results indicate that the reduction in anxiety within the hypnosis group was not statistically significant.

Table 59

Means and Standard Deviations of the Pretreatment Anxiety Scores of all Six Groups

Group	N	Mean	Standard Deviation
Hypnosis	12	7.75	4.69
Coaching (Dietician)	13	7.85	3.93
Coaching (Experimenter)	12	7.83	4.11
No Treatment	12	7.75	3.93
Internals	10	5.00	4.76
Compliants	7	5.57	3.55

Table 60

One Way ANOVA Test of the Pretreatment Equivalence of all Six Groups Regarding Anxiety

Source	DF	SS	MS	F	P
Among	5	84.20	16.84	.95	.45
Within	60	1063.57	17.72		
Total	65	1147.77			

Table 61

Means and Standard Deviations of Posttreatment Equivalence of All Groups Regarding Anxiety

Group	N	Mean	Standard Deviation
Hypnosis	12	6.25	4.00
Coaching (Dietician)	13	7.54	4.27
Coaching (Experimenter)	12	8.00	4.13
No Treatment	12	8.17	4.37
Internals	10	5.10	4.70
Compliants	7	6.57	3.60

Table 62

One Way ANOVA Test of the Posttreatment Equivalence of All Six Groups Regarding Anxiety

Source	DF	SS	MS	F	P
Among	5	76.18	15.24	.85	.51
Within	60	1069.76	17.83		
Total	65	1145.94			

Table 63

Results of T-Tests for Changes in Anxiety Within Each Group

Group	N	Pre-Post Change	t-ratio	P
Hypnosis	12	-1.50	-1.78	.10
Coaching (Dietician)	13	-.31	-1.0	.34
Coaching (Experimenter)	12	.17	.43	.67
No Treatments	12	.42	1.16	.27
Internals		.10	1.0	.34
Compliants	7	1.82	1.45	.20

No significant change in anxiety occurred during the study, either within or among the various groups.

Section 5

This part of the chapter presents data analyses relating the various independent and dependent variables to one another. The relationships among the selected independent variables (i.e., age, sex, educational level, and time on dialysis) and the dependent variables (i.e., compliance, locus of control, and anxiety) were analyzed via multiple regression. Further analysis of the relationships among the variables was carried out through t-tests and correlational analysis. Means and standard deviations of the independent variables were presented in Table 8.

Independent Variables and Compliance Variables

Table 64 summarizes the results of the multiple regression analyses concerning the independent variables and the compliance variables. The tables whose results are summarized in Table 64 are found in Appendix C. Table 64 reveals a significant sex or gender effect regarding overall compliance and weight-gains at both pre- and posttreatment levels. The compliant group was composed entirely of women. Women were markedly more fluid compliant than men in this study. Table 64 also shows a significant relationship between sex and BUN levels at pretreatment and posttreatment. Again, women evidenced better BUN adherence than men. It is concluded, therefore, that women in this study were, with the exception of potassium compliance, significantly more adherent to the regimen than men.

Table 64 also reveals a significant age effect for pretreatment BUN and posttreatment fluid compliance, and marginal age effects for posttreatment overall compliance and BUN. Table 65, which presents the results of the correlational analysis among age, educational level, time on dialysis, and the compliance variables, helps to shed light on the age effect findings of the multiple regression analysis. Significant negative correlations were found between age and weight-gains at both pre- and posttreatment. This means that older patients were more likely to be fluid compliant than younger patients (i.e., younger patients, higher compliance scores). The correlation analysis results in Table 65 also confirm the age effect found in the regression analysis for pretreatment BUN compliance. Again, older patients were significantly more likely to adhere to the diet's

Table 64

Summary of Tables 73-80 Regarding Multiple Regression on Selected Independent Variables and the Compliance Variables

	C_1	WG_1	K_1	BUN_1	C_2	WG_2	K_2	BUN_2
Age								
F ratio	2.02	2.75	1.32	6.52	3.40	6.46	1.18	3.67
P	.16	.10	.25	.0053+	.07	.013[a]	.28	.06
Sex								
F ratio	8.41	9.71	2.80	6.78	7.27	7.17	1.29	5.22
P	.0051+	.003*	.10	.009+	.009+	.009+	.26	.025[a]
Education								
F ratio	.92	.78	2.32	1.67	3.17	3.65	1.31	2.42
P	.34	.38	.13	.20	.08	.06	.26	.12
Time of Dialysis								
F ratio	.11	.54	.81	.00	.41	.21	.43	.09
P	.74	.46	.37	.97	.52	.65	.51	.76

Key: C = overall compliance
WG = weight gain
K = potassium
BUN = Blood urea nitrogen
1+2 = pre- and posttreatment level
* = significant at the .005 level
+ = significant at the .01 level
a = significant at the .05 level

protein restrictions than were younger patients at the start of the study, though this effect weakens by posttreatment time. The correlation coefficients for age all favor older patients, suggesting that older patients (i.e., patients 48 years of age and above) were generally more likely to be compliant than their younger counterparts, particularly in regards to the fluid restrictions of the regimen.

The results of the multiple regression analysis depicted in Table 64 and the results of the correlational analysis presented in Table 65 concur that educational level and length of time on dialysis were not significantly related to the compliance variables in this study.

Locus of Control and Compliance

One of the theoretical underpinnings of this study was the assumption of a relationship between locus of control and compliance. As mentioned in the literature review, internality is considered an aid to managing one's medical regimen. That was not the case in this study. As Table 14 showed clearly, the internal subjects had the poorest pretreatment compliance of all the groups in the study! The Pearson correlation coefficients obtained for the relationships between locus of control and the compliance variables are found in Table 66. No significant relationships exist. Moreover, all the correlations are negative, indicating that the trend was for externality to be more predictive of compliance! It is concluded that locus of control was not significantly related to any aspect of compliance.

Anxiety and Compliance

Anxiety was not a significant factor in subjects' compliance

Table 65

Pearson Correlation Coefficients of the Relationships Between Age, Education, and Time on Dialysis and Each Compliance Criterion (N=68)

Variable	C_1	WG_1	K_1	BUN_1	C_2	WG_2	K_2	BUN_2
Age	-.213	-.251	-.232	-.322	-.212	-.295	-.205	-.236
P-Value	.08	.038+	.056	.007*	.08	.01*	.09	.052
Education	-.087	-.075	.202	-.094	-.194	-.164	.162	-.141
P-Value	.48	.54	.10	.44	.11	.18	.18	.25
Time on Dialysis	.059	.108	.114	.051	-.037	-.002	.091	.003
P-Value	.63	.38	.35	.68	.76	.99	.45	.97

Key: C = overall compliance
WG = weight-gains
K = potassium
BUN = blood urea nitrogen
1+2 = pre- ande post-values
* = significant at .01 level
+ = significant at .05 level

Table 66

Correlations Between Locus of Control and Each Compliance Variable (N=66)

Compliance Variable	Pre-Locus of Control	Post-Locus of Control
Overall Compliance 1	-.177	-.169
P	.15	.17
Weight Gain 1	-.191	-.191
P	.11	.12
Potassium 1	-.050	-.027
P	.68	.83
BUN 1	-.173	-.020
P	.16	.33
Overall Compliance 2	-.189	-.166
P	.12	.18
Weight-Gain 2	-.197	-.187
P	.107	.13
Potassium 2	-.016	-.019
P	.89	.88
BUN 2	-.174	-.116
P	.15	.35

problems in this study. Table 67 provides the Pearson correlation coefficients between anxiety and all aspects of compliance. None approach statistical significance. Therefore, it is concluded that no significant relationship exists between subjects' scores on Bendig's (1956) Short Form of the Manifest Anxiety Scale and their compliance.

High and Low Hypnotizability and Compliance

The experimenter was interested in the relationships between subjects' hypnotizability and their compliance. To gain a clear understanding, t-tests were run on the mean compliance values of subjects manifesting high and low hypnotizability on the SHCS: Adult. Eleven subjects scored four or five on the scale, indicating high hypnotizability, and eight subjects scored 0 or 1, indicating low hypnotizability. The results of the t-tests of their compliance means appear in Table 68. As indicated by the table, no significant differences exist between the groups on any compliance variable. It is concluded, therefore, that hypnotizability was not significantly related to compliance among subjects in this study.

Table 67

Correlations Between Anxiety and Each Compliance Variable

Compliance Variable	Pre-Anxiety	Post-Anxiety
Overall Compliance 1	-.005	-.043
P	.96	.17
Weight-Gain 1	-.041	-.009
P	.74	.58
Potassium 1	-.031	-.025
P	.80	.84
BUN 1	-.123	-.096
P	.31	.44
Overall Compliance 2	.024	.047
P	.85	.70
Weight-Gain 2	.001	.048
P	.99	.70
Potassium 2	-.076	-.018
P	.54	.89
BUN 2	-.166	-.173
P	.18	.16

Table 68

T-Test Results Between High and Low Hypnotizable Subjects Regarding Each Compliance Criterion

Compliance Criterion	Hypnotizability	N	Mean	T	P
Overall Compliance 1	High	11	5.82	.49	.63
	Low	8	5.50		
Weight Gain 1	High	11	5.83	.34	.74
	Low	8	5.59		
Potassium 1	High	11	5.23	.33	.74
	Low	8	5.09		
BUN 1	High	11	98.13	-.02	.98
	Low	8	98.29		
Overall Compliance 2	High	11	5.64	.19	.85
	Low	8	5.50		
Weight-Gain 2	High	11	5.54	.34	.74
	Low	8	5.34		
Potassium 2	High	11	5.23	.39	.70
	Low	8	5.08		
BUN 2	High	11	92.73	-.02	.98
	Low	8	98.12		

CHAPTER V

SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS

This chapter presents a summary of the experimental study, discusses the implications of the findings in light of the professional literature, and provides recommendations for future research.

Purpose of the Study

This research was designed to test the effectiveness of two treatments - hypnotherapy and behavioral "coaching" - in improving the medical compliance of chronically noncompliant kidney dialysis patients. The study also examined the effectiveness of the two treatments in reducing patient's anxiety and in altering their locus of control expectancies. The relationships among the dependent variables (compliance, locus of control, and anxiety) and selected independent variables (age, sex, education, and time on dialysis) were also examined.

Review of the Literature

Since the advent of the artificial kidney and the availability of dialysis treatment to the masses, over 3000 articles and books have been published on all aspects of kidney dialysis (Armstrong, 1984). This study reviewed the literature regarding hemodialysis noncompliance. It discussed the assessment and magnitude of noncompliance, along with the methodologic problems inherent to

dialysis research. Factors associated with noncompliance, including demographic variables, psychological variables, and aspects of the dialysis regimen itself were also reviewed. Finally, treatment interventions designed to improve adherence to the dialysis regimen were identified and evaluated.

The experimenter determined that nearly half the patients reviewed in the literature were noncompliant with some aspect of their regimen. This figure is alarming since the consequences of nonadherence include serious medical complications and death (Gutch and Stoner, 1975). The review also indicated that, in general, demographic variables are unrelated to dialysis noncompliance, a finding consistent with medical research (Haynes, Taylor, and Sackett, 1979).

The analysis of the psychological factors affecting compliance revealed noncompliant behavior to be a complex and, perhaps, overdetermined phenomenon. Dialysis patients struggle with issues of dependence versus independence (Abram, 1968, 1969, 1974; Kaplan-DeNour and Czaczkes, 1972; Procci, 1981; Levy, 1984), and their idiosyncratic attempts to resolve the conflict may result in noncompliance. Some patients experience high levels of anxiety and/or depression (Retan and Lewis, 1965; Abram, Moore, and Westervelt, 1971; Kaplan-DeNour and Czaczkes, 1976; Parker, 1981; Kaplan-DeNour, 1982), and these problems may also contribute to nonadherence. The review also explained that patient's defensive management of the stress and anxiety inherent to renal failure and dialysis, either through a massive use of denial (Glassman and Siegel, 1970) or by adopting an external locus of

control (Goldstein and Reznikoff, 1971; Wenerowicz, Riskind, and Jenkins, 1978; Poll and Kaplan-DeNour, 1980), can also result in adherence problems.

The review of the interventions designed to improve patients' adherence indicated that behavioral treatments (Barnes, 1976; Magrab and Papadopoulou, 1977; Hart, 1979; Keane, Prue, and Collins, 1981; Cummings, Becker, Kirscht, and Levin, 1981) and hypnotherapy (Morrill, 1978; Martin, McHugh, Millar, Gibbons, Morgan, and Dickinson, 1983; Surman and Tolkoff-Rubin, 1984) have demonstrated effectiveness in helping patients adjust to dialysis and to improve their compliance to the dialysis regimen.

Methodology

As mentioned, the present research was designed to test the effectiveness of two interventions in improving the compliance of chronically noncompliant dialysis patients. The study employed 72 adult subjects who were chronic kidney dialysis patients at a private, outpatient center in Chicago.

The medical compliance of the 72 subjects was determined with the use of a modified version of a compliance scale developed by Drs. Kaplan-DeNour and Czaczkes (1972). The subjects' locus of control expectancies and their anxiety were measured with Rotter's (1966) I-E Scale and Bendig's (1956) Short Form of the Manifest Anxiety Scale, respectively. From the sample of 72 subjects, 52 subjects who evidenced both noncompliance and externality were then selected for a purposive sample which received the experimental treatments. The remaining 17 subjects comprised two auxiliary control groups of either

compliant subjects or internal subjects (no subject was both compliant and internal).

Subjects in the purposive sample were then randomly assigned to four groups of 13 subjects each: hypnotherapy, coaching provided by the experimenter, coaching provided by the center's dietician, and a no treatment control group. Subjects in the hypnosis and coaching groups were administered the Stanford Hypnotic Clinical Scale for Adults to test their hypnotizability. A one-way analysis of variance of the subjects' hypnotizability (see Table 12) revealed that the groups were equivalent regarding hypnotizability, so the treatment phase was initiated.

For ten weeks, subjects in the hypnosis group received individual hypnotherapy provided by the experimenter. The clinical aim of the hypnosis was to foster attitudes of mastery and control among the subjects, and to engage them in efforts to adhere to their medical regimen. Subjects in the coaching groups met individually for 10 weeks with either the experimenter or the dietician. The goal of the coaching treatment was to provide encouragement and information to subjects in a systematic fashion, to help them adhere more closely to their dialysis regimen. Subjects in the no treatment group received only routine medical care during the treatment phase. At the end of the treatment phase, the medical compliance, locus of control, and anxiety of the subjects were again measured.

The design of the research was twofold: (1) a pretest/posttest experimental control design, which allowed for analysis of the effects of the treatments on the pre- and posttest measures of anxiety, locus

of control, and compliance; and (2) a split plot, repeated measures design, which enabled the experimenter to observe and analyze the effects of the treatments on compliance over time throughout the study. Subjects were matched for locus of control, compliance, and hypnotizability, and then randomly assigned to one of the four treatment groups. Additional controls (internals and compliants) were used for further comparisons among groups.

Four research hypotheses were tested:

(1) Subjects receiving hypnotherapy will evidence greater improvement in compliance than all other groups. The compliant subjects will show no change in compliance.

(2) Both coaching groups will show improvement in compliance, while the no treatment control group, the compliant subjects, and the internal subjects evidence no change in compliance.

(3) Subjects receiving hypnotherapy will show greater change in locus of control than all other groups, and the change will be in an internal direction. The internal subjects will evidence no change in locus of control.

(4) Hypnotherapy subjects will demonstrate greater reduction in anxiety than all other groups.

A multiplicity of statistical techniques was employed to analyze the data. To determine the effectiveness of the treatments, and to examine the relationships among the selected independent variables and the dependent measures, two broad null hypotheses were tested:

(1) There are no significant differences among groups across compliance, locus of control, or anxiety.

(2) There are no significant relationships among selected independent variables (age, sex, educational level, and time on dialysis) and compliance, locus of control, or anxiety.

The assumptions that the groups were matched was tested by one-way analyses of variance. The first null hypothesis was tested by one-way analyses of variance, Duncan Multiple Range Tests, multivariate repeated measures analysis of variance, and simple repeated measures analysis of variance. T-tests were also employed to test for significant changes within each group. The second null hypothesis was tested using multiple regression. Further analysis of the relationships among the independent and dependent variable was carried out with t-tests and correlational analysis.

The Findings

Findings pertaining to the hypotheses:

1. The experimenter determined that hypnosis was not significantly more effective in improving overall compliance, fluid compliance, potassium compliance, or BUN compliance to the dialysis regimen than either the coaching treatment or routine medical care.

2. Hypnosis was effective in reducing subjects' weight-gains below their baseline levels during only one of the ten weeks of the study, and that week was followed by the subjects' worse noncompliance of the study.

3. Subjects receiving hypnosis did not show greater change in locus of control than other subject groups. In fact, there was very little change in locus of control among any of the groups in the study.

4. Hypnosis did not demonstrate significantly greater effectiveness in reducing anxiety than the coaching treatment or routine medical care. Subjects receiving hypnosis showed change in anxiety in the anticipated direction; however, the reduction was neither statistically greater than that of the other groups, nor significantly different than their own pretreatment levels of anxiety.

5. Subjects receiving the coaching treatments did not show significantly greater improvement in overall compliance, fluid compliance, potassium compliance, or BUN compliance than the no treatment controls, the internals, or the compliant subjects.

6. The coaching treatment proved effective, however, in significantly reducing the BUN levels of both coaching groups, the only subjects in the study to evidence such improvement. The coaching groups also demonstrated marginal improvements in fluid adherence while all other groups' weight-gains became worse. The dietician's group evidenced fluid adherence levels significantly better than their baseline level during four of the ten weeks of the study, and retained improved weight-gains throughout the entire study. The experimenter's coaching group was less successful, but reached significantly improved fluid compliance during one of the ten weeks.

Other findings:

7. The fluid adherence and overall compliance of the compliant subjects became significantly worse during the study. Indeed, these subjects were the only ones to show statistically significant degeneration in any compliance criterion.

8. It was determined that sex was significantly related to

compliance in this study. Women were markedly more fluid and protein compliant than men (as seen in their weight-gains and BUN values), and women evidenced significantly better overall compliance than men. The group of compliant subjects was comprised entirely of women.

9. Age was found to be significantly related to fluid and BUN compliance. Older patients evidenced markedly lower weight-gains than younger patients. Older patients were also more BUN compliant than younger patients at pretreatment levels.

10. Length of time on dialysis was found to be unrelated to compliance.

11. Educational level was not significantly related to any compliance criterion.

12. There was no significant relationship between locus of control and any aspect of compliance.

13. Anxiety was also found to be unrelated to compliance.

14. It was also determined that hypnotizability was not significantly related to any aspect of compliance.

15. Only seven of 68 subjects (10.3%) were compliant with the regimen at pretreatment. The mean overall compliance score on Kaplan-DeNour and Czaczkes' (1972) Scale was 5.53, indicating severe abuse of the regimen. The sample evidenced severe fluid noncompliance and moderate protein noncompliance. Interestingly, the sample had excellent potassium adherence throughout the study.

16. The review of the literature revealed that dialysis compliance research is fraught with methodologic inconsistency regarding the assessment of compliance.

Discussion and Implications of the Findings

In the present study, hypnotherapy was not effective in improving compliance or altering the locus of control of dialysis patients. These results fail to confirm the findings of Morrill's (1978) doctoral research, in which dialysis patients receiving hypnotherapy evidenced marked reductions in weight-gains and significant shifts in locus of control toward internality. Among other research examining the effectiveness of hypnosis in improving dialysis adherence (Dimond, 1981; Martin, McHugh, Millar, Gibbons, Morgan, and Dickinson, 1983; Surman and Tolkoff-Rubin, 1984), only Surman and Tolkoff-Rubin reported any failures. They treated two patients for noncompliance, but only one improved. They offered no explanation for the ineffectiveness of the hypnosis with the one patient. A number of different factors may explain the failure of the present research to replicate (or approximate) Morrill's findings.

The underlying premise of the present study, i.e., that locus of control and medical compliance of dialysis patients are related, was not supported by the data. While the sample was markedly external in its locus of control orientation, a characteristic observed in other dialysis populations (Goldstein and Reznikoff, 1971; Blackburn, 1977; Poll and Kaplan-DeNour, 1980; Ballin and Hart, 1982), no relationship was found between patients' externality and their generally poor compliance. In fact, the internally-oriented subjects in this study were among the worse abusers of the regimen. Blackburn (1977) also observed that, despite high externality among subjects in her study, no relationship existed between locus of control and compliance.

The strategy of the hypnotherapy was based upon the assumed relationship between locus of control and compliance. The intervention was designed to reduce patients' stress and to foster attitudes of control and mastery which would encourage patients to actively participate in their own medical treatment. This was Morrill's reported strategy (1978), and it was predicated on the theory that the high externality among dialysis patients was a result of a shift in their perceptions of control. Goldstein and Reznikoff (1971) and Viederman (1974) view this perceptual shift as a defensive reaction to the many losses and threats which renal failure and the concomitant, pervasive dependence of dialysis entail. The hypnotherapeutic strategy, then, implied a re-shifting of patients' perceptions of control, which would result in their viewing themselves "as prime movers rather than controlled objects..." (Viederman, 1978, p. 464) of their medical condition and treatment. The expected outcome of the internal shift was improved compliance with a regimen that ensures relatively good health.

However, the high externality among patients in the present study does not appear to have been precipitated by the stresses of end stage renal disease. Rather, it is likely that subjects' locus of control was a function of their socioeconomic status. Over 90 percent of the subjects were Black, from the West Side of Chicago, and over 94 percent had incomes less than $10,000. Many had been on welfare for decades, and less than 30 percent had completed high school. Rotter (1966) and Lefcourt and Ladwig (1965) first reported that socioeconomic status and race have a strong influence on generalized

locus of control expectancies. The fewer opportunities which the environment offers to exercise control over one's life or to observe others' doing so, the less likely one is to acquire an expectancy of personal control. Therefore, the external, and perhaps fatalistic, outlook of subjects in this research was likely to have been characterological in nature rather than an acute reaction to renal failure and the prospect of chronic illness.

It follows, then, that the hypnotherapeutic strategy of reducing stress and fostering attitudes of mastery and control was a poor fit for the purposive sample. Their chronic noncompliance was not a function of their locus of control expectancies. Instead, they resemble the severe abusers of the regimen mentioned in Procci's (1981) study, who had historically experienced difficulties resolving their dependency issues before renal failure. For these patients, adherence to their dialysis regimen carried "the threat of loss of dependent need fulfillment" (Procci, 1981, p. 117). Procci, and Kaplan-Denour and Czaczkes (1972), suggested that for extreme abusers of the regimen, like those in the present research, noncompliance helps to ensure the continuance of their illness, thus safeguarding their dependency. This is the primary gain from the sick role discussed by Kaplan-DeNour and Czaczkes.

It is reasonable to assume, then, that the failure of the hypnotherapy was due in part to its being designed for a population (similar to the USC Hospital outpatients in Morrill's study) for whom improved compliance and improved functioning were more attractive than psychologically threatening. While Morrill did not provide

sociodemographic data in her dissertation, she indicated in a personal communication (Morrill, 1986) that her population and that of the present research were different. She stated that subjects in her study were mostly White, middle-class dialysis patients at USC Hospital. Her reported success in altering locus of control among these patients would suggest that their externality was of a more acute nature than the chronic external orientation of patients in this study.

The relative effectiveness of the coaching treatments, impressive in light of the performance of the other groups in the study, partially confirms the findings of Cummings et al. (Cummings, Becker, Kirscht, and Levin, 1981), who found three different behavioral interventions effective in improving fluid compliance among dialysis patients they treated. One of their interventions, a telephone contact treatment, was quite similar to the coaching treatment in the present study, with the exception that the contact with patients was over the phone rather than in person. Cummings et al.'s treatment included gathering information from patients regarding problems with the regimen, providing information about the medical consequences of noncompliance and the benefits of adherence, suggesting techniques for improved compliance, and giving verbal encouragement for maintaining adherence. Each of these elements was present in the coaching treatments. Cummings and his colleagues found that the treatment significantly improved fluid compliance over a six week period. However, the compliance of all patients, regardless of the type of interventon received, degenerated once the interventions ceased. The

authors commented that long term interventions seem necessary to stem the inexorable tide of noncompliance.

No follow up research has yet been performed with the coaching subjects in the present study, to see whether their significant gains in BUN compliance and marginal gains in fluid compliance have disappeared since the treatments have been discontinued. But the implications of Cummings et al.'s findings, i.e., that in the absence of long term assistance, many patients will not adhere to the restrictions of the regimen; were confirmed by the behavior of the patients in this research. To begin with, nearly 90 percent were fluid noncompliant at pretreatment! With the exception of the coaching groups, the weight-gains of all groups in the study increased during the ten weeks, though the increase was not statistically significant except among the compliant subjects. The compliants evidenced a marked increase in weight-gains (significant at .005). Their poorer compliance can best be attributed to the shear difficulty, cited by Cummings et al., of sustaining reduced fluid intake. This is probably especially the case during the warmer months of the year when this research was run (May, June, July, 1984).

The success of the coaching treatments in significantly reducing the BUN levels of patients is valuable to psychonephrology for a number of reasons. First of all, the health of the patients involved was safeguarded. In a two year study of the psychobiologic factors associated with survival on hemodialysis, Foster, Cohn, and McKegney (1973) found that among the 21 patients they studied, the seven who died were characterized by high BUN levels which the authors

attributed to dietary indiscretion. Therefore, by improving patients' compliance with the diet, the coaching treatments may have reduced their risk of lethal BUN levels. Secondly, the effective improvement of BUN compliance has only one precedent in the literature, and that involved pediatric dialysis patients. Magrab and Papadopoulou (1977) reported success in reducing the BUN levels of four childrn, utilizing a token economy. By way of contrast, the coaching treatments were applied to two groups of 13 adult patients, with each group evidencing significantly reduced BUN values. The simplicity of the intervention, making it relatively easy to treat groups of patients, is another aspect of the finding which is valuable to psychonephrology, because it invites replication. The effectiveness of the treatment can easily be tested again, and the dietary knowledge necessary for its application is routinely held by most center dieticians, nurses, and even technicians. Therefore, the simplicity of the treatment and its effectiveness in modifying BUN noncompliance also have implications for professionals working with dialysis patients. With relative ease, professionals can help patients reduce potentially lethal BUN levels through regularly scheduled interventions in which the patients are involved in monitoring their own protein intake. The weekly "coaching" contact, with its aspects of monitoring, helpful hints, and encouragement, may be sufficient in substantially improving patients' compliance, and safeguarding their health. It should be considered by anyone attempting to help patients improve their dietary compliance.

The finding that women were markedly more compliant than men in all criteria besides potassium adherence is discordant with most

dialysis research, in which no relationship is found between gender and compliance (see Table 2 in Chapter II). Kiriloff (1981) found women generally more compliant than men; and Cummings, Becker, Kirscht, and Levin (1982) found women significantly more fluid compliant than men. Cummings et al. provided no socioeconomic data on their sample, so it cannot be determined whether or not their subjects resemble the patients in this research. Kiriloff's study provided no income figures, but did report that there were 15 Black patients (25%) and 45 White patients (75%). That is a very different racial makeup than the composition of the present study in which over 90 percent of the subjects were Black. Kiriloff speculated that the dietary restrictions required in hemodialysis may facilitate compliance by women "since women more easily adjust their food preferences and/or more willingly adopt the special food preparation required" (Kiriloff, 1981, p. 18). She gives no references to support those claims.

The reasons behind women's superior compliance in the present study are a matter for speculation. A reasonable explanation is that women in this study found compliance more role congruent than did men. It is perhaps less threatening for poor, middle-aged, Black women to comply with doctor's orders because compliance allows continuation of a dependent role which is ego syntonic. In other words, compliance demands less psychological adjustment from such persons. Conversely, for the men in this study, compliance (and thus improved health) may represent the expectation that they assume more independent lifestyles, e.g., go to work, than they are psychologically prepared to do. For other, more independent men, perhaps their noncompliance

represents an assertion of their independence (Abram, 1974), or displaced hostility against the dependency which chronic illness entails (Kaplan-DeNour and Czaczkes, 1972).

The finding that older patients were generally more adherent than younger patients is also an odd one among dialysis compliance research. Only Hartman and Becker (1978) and Cummings et al. (1982) found any relationship between age and compliance, among the 16 studies reviewed by the experimenter. Hartman and Becker reported that older patients were more potassium and phosphorus compliant than younger patients. Cummings and his colleagues learned that older patients were more likely to comply with the phosphorus and fluid restrictions of the regimen. Unfortunately, the authors in each study neglected to discuss their age findings. In the current study, it seems reasonable to interpret the age effect in light of physiology and the dependency-independency conflict. Anecdotally, many of the older patients were frail. Many expressed sincere desires to feel better, to avoid the general malaise which can accompany dialysis. Physically frail patients find it difficult to tolerate large fluid weight-gains without feeling bloated and experiencing shortness of breath. The responsiveness of their frail bodies, therefore, may have increased the motivation of some older patients to adhere to the regimen. In contrast, many of the younger patients seemed impervious to the immediate effects of their noncompliance, unless it took on binging proportions. Routine poor adherence did not seem to result in much physical discomfort, though the consequence during dialysis, such as severe leg cramping, was quite aversive. (However, patients

frequently attributed their cramping to problems with the machine or to the incompetence of the technicians!) In general, the stronger bodies of younger patients seem to shield them from feeling the effects of their noncompliance, thereby decreasing their motivation for adhering to the regimen.

From a psychological perspective, dependency is probably more role congruent for older patients than for younger ones. The younger patients, therefore, were more likely prey to the vicissitudes of the dependency-independency conflict than their older counterparts. Their poorer compliance, then, could be interpreted as resulting from idiosyncratic struggles with the dependency double bind: for some, noncompliance may have been an assertion of their independence; for others, a means of avoiding the responsibilities of living as independent adults; and for many, noncompliance may have been episodic expressions of hostility against the pervasive dependency of chronic dialysis. It would seem that younger patients, with their own and societal expectations for achievement, might find the inherent dependency of dialysis quite aversive, while older patients, with fewer expectations, might adjust more easily to an increasingly dependent role.

The findings that length of time on dialysis and educational level were unrelated to adherence is consistent with medical research (Haynes, Taylor, and Sackett, 1979), and concurs with the experimenter's review of the dialysis literature.

The severity of noncompliance observed in this study is unprecedented in dialysis research. Eighty-nine percent of the

subjects were noncompliant, and the mean score on Kaplan-DeNour and Czaczkes' (1972) compliance scale was 5.52, indicating severe abuse. The poorest overall compliance reported in the literature (see Table 1 in Chapter II) was found by Agashua, Lyle, Livesley, Slade, Winney, and Irwin (1981), who were experimenting with two different cutoff values for fluid compliance. Using one kilogram as the cutoff (2.2 lbs.), only 31 percent of their 35 patients were compliant. Less than 11 percent were compliant in the present study, using 3.3 lbs. as the compliance cutoff.

The reasons for the severity of poor compliance among this population are, again, a matter for speculation. One fact is clear: the degree of abuse is a direct reflection of the patients' fluid noncompliance. Their BUN levels were only moderately noncompliant, and the entire population evidenced excellent potassium compliance. Their adherence to the potassium restrictions seems to indicate an awareness of the potentially lethal consequences of irregular potassium levels in the blood (Gutch and Stoner, 1975), a fact which is stressed by the center's dietician and medical staff. It suggests that the dramatic extent of the patients' fluid noncompliance is not, in general, of a suicidal nature, because it would be easier to kill oneself by abusing the potassium restrictions.

To what then, is the routinely terrible fluid adherence of this patient group to be attributed? As mentioned, it is markedly worse than any group presented in the literature. The experimenter believes that a combination of factors are involved. First, these patients' sources of gratification are quite limited. The population is

generally very poor, few hold jobs, others have not had regular employment for years, if ever. Their families cannot, in many cases, carry the burden of financially supporting them. The normal avenues of adult gratification are blocked. As the chief nephrologist commented one day during the study, "they can't eat, they can't drink, they can't have sex, and most of them can't work...." In other words, the deprivations which these dialysis patients encounter are severe. In the absence of material comfort, family support, and the possiblity of returning to work, the opportunities for some form of gratification are negligible. This leads to another factor involved in their noncompliance, limited frustration tolerance. It would seem that to endure the deprivations of their lifestyle and still adhere to the regimen, patients would have to have a strong tolerance for frustration (Procci, 1978). Kaplan-DeNour and Czaczkes (1972) found low frustration tolerance the most frequent cause of poor adherence among the 43 patients they observed, and they commented on the obduracy of the problem, saying that nothing was successful in modifying patients' frustration tolerance. Procci (1978) concurred with Kaplan-DeNour and Czaczkes, adding that the capacity to remain vocationally active while on dialysis and the capacity to adhere to the regimen were related, both indicative of high frustration tolerance. He found that 81 percent of patients who were not vocationally active were poor compliers.

The patients in this study did not, for the most part, work or remain active. With few opportunities for gratification and low tolerance for frustration, most of these patients got their routine

gratification orally, and they did so in a way which caused minimal immediate pain and avoided the threat of death, i.e., they ingested fluids. While their dietary indiscretion was amenable to modification through the coaching treatments, their fluid noncompliance was, in general, unrelenting. This fact is not so mysterious when fluid intake is seen as one of the only sources of gratification in patients' lives. This has strong implications for psychologists and other professionals who work with dialysis patients. Those who attempt to improve patients' fluid adherence, particularly patients with few other opportunities for adult gratification, should take into consideration the powerful reinforcement value which fluid intake possesses. Long term success in modifying fluid intake will probably have to include alternate means of gratification for such patients, whether that be psychological in nature, e.g., a sense of well being or self control; or in some other forms, e.g., material prizes (Magrab and Papadopoulou, 1977; Hart, 1979), social support (Keane, Prue, and Collins, 1981), or even oral rewards themselves (Barnes, 1976; Keane, Prue, and Collins, 1981).

Recommendations for Future Research

Many aspects of this study suggest worthwhile avenues for future research. First of all, the experimenter recommends that follow-up research be performed to gather information about the compliance of the subjects subsequent to the treatment phase of this study. Specifically of interest is whether the coaching subjects maintained their improved BUN levels once the treatment was discontinued, and also, whether or not the compliant subjects' adherence improved,

stabilized, or continued to deteriorate with the passage of time. These findings could have implications for the design of long term interventions to improve or maintain compliance.

The sociodemographic composition of the subject sample in the present study appears to have confounded the findings regarding locus of control and compliance. Therefore, the experimenter recommends that this research be replicated with a more heterogeneous group of dialysis patients. The new design would allow the relationship between locus of control and compliance to emerge more clearly. It could also make it possible to test whether externality among dialysis patients can be modified. This, in turn, could shed light on the theory that for many dialysis patients, externality is a defensive, perceptual shift in response to the stresses of end stage renal disease and chronic dialysis. It is further recommended that more than one hypnotherapist provide the hypnosis in future research, so to control for the skill of the therapist.

The failure of the hypnosis to improve medical compliance with the present subject population raised the question for the experimenter of whether a permissive approach to hypnosis is likely to be effective with characterologically external subjects, or whether an authoritarian approach to the suggestions would be more successful. The experimenter recommends that research be carried out which would test both approaches with groups of internally- and externally-oriented subjects. The results of the research would add to the body of knowledge examining the effectiveness of hypnosis with different personality traits, and could be valuable in helping

clinicians place their hypnotic suggestions in the form most likely to be successful with individual subjects.

The dialysis compliance research is marred by lack of methodologic rigor and consistency, particularly in the area of compliance assessment. The experimenter's modified version of Kaplan-DeNour and Czaczkes' (1972) compliance scale allows for quantification, and includes compliance categories which are more sensitive to severe levels of fluid noncompliance than those in the original scale. The modified scale could easily be augmented to include other criteria, such as phosphorus or creatinine levels. The experimenter recommends that the scale be employed in future dialysis adherence research, to test its value as a compliance assessment instrument.

The dramatic level of fluid noncompliance observed among subjects in this research is certainly intriguing, and it raises the question of whether this degree of noncompliance is typical of very poor, Black patient populations. No dialysis research to date has reported a strong correlation between socioeconomic status, or race, and adherence (see Table 2, Chapter II). It seems worthwhile, then, to further pursue the findings of this study to learn whether very poor, Black patient populations are susceptible to severe abuse of their regimens. Therefore, the experimenter recommends that compliance research be carried out with similar patient groups around the country, to establish whether there exists a pattern of severe noncompliance among these patients.

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APPENDIX A

Augmented Kaplan-DeNour and Czaczkes Compliance Scale

(Scores below 4 are compliant. Scores 4 and above noncompliant.)

1. Weight gain between dialyses is below 500 g. (1.1 lbs.).
   Potassium levels are below 5.5 mEq/L.
   BUN levels are below 50 mg. per cent of whole blood.

2. Weight gains between 1.11 and 2.2 lbs.
   Potassium levels between 5.5 and 6.9 mEq/L.
   BUN levels are between 51 and 70 mg. per cent.

3. Weight gains between 2.21 and 3.3 lbs.
   Potassium levels between 6.01 and 6.5 mEq/L.
   BUN levels between 71 and 90 mg. per cent.

4. Weight gains between 3.31 and 4.4 lbs.
   Potassium levels between 6.51 and 7.0 mEq/L.
   BUN levels between 91 and 110 mg. per cent.

5. Weight gains between 4.41 and 5.5 lbs.
   Potassium levels between 7.01 and 7.5 mEq/L.
   BUN levels between 111 and 130 mg. per cent.

6. Weight gains between 5.51 and 6.6 lbs.
   Potassium levels betwen 7.51 and 8.0 mEq/L.
   BUN levels between 131 and 150 mg. per cent.

7. Weight gains between 6.61 and 7.7 lbs.
   BUN levels between 151 and 170 mg. per cent.

8. Weight gains between 7.71 and 8.8 lbs.
   BUN levels between 171 and 190 mg. per cent.

9. Weight gains betwen 8.81 and 9.9 lbs.
   BUN levels between 191 and 210 mg. per cent.

10. Weight gains greater than 9.91 lbs.
    BUN levels greater than 210 mg. per cent.

Adapted from Kaplan-DeNour and Czaczkes, 1972; 1974

I-E Scale

Instructions: Select one statement of each pair which you more strongly believe to be the case as far as you're concerned. Black-in your choice on the answer sheet.

1.a. Children get into trouble because their parents punish them too much.
  b. The trouble with most children nowadays is that their parents are too easy with them.

2.a. Many of the unhappy things in people's lives are partly due to bad luck.
  b. People's misfortunes result from the mistakes they make.

3.a. One of the major reasons why we have wars is because people don't take enough interest in politics.
  b. There will always be wars, no matter how hard people try to prevent them.

4.a. In the long run people get the respect they deserve in the world.
  b. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.

5.a. The idea that teachers are unfair to students is nonsense.
  b. Most students don't realize the extent to which their grades are influenced by accidental happenings.

6.a. Without the right breaks one cannot be an effective leader.
  b. Capable people who fail to become leaders have not taken advantage of their opportunities.

7.a. No matter how hard you try some people just don't like you.
  b. People who can't get others to like them don't understand how to get along with others.

8.a. Heredity plays the major role in determining one's personality.
  b. It is one's experiences in life that determine what they're like.

9.a. I have often found that what is going to happen will happen.
  b. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

10.a. In the case of the well prepared student there is rarely if ever such a thing as an unfair test.
  b. Many times exam questions tend to be so unrelated to coursework that studying is really useless.

11.a. Becoming a success is a matter of hardwork, luck has little or nothing to do with it.
b. Getting a good job depends mainly on being in the right place at the right time.

12.a. The average citizen can have an influence in government decisions.
b. This world is run by the few people in power, and there is not much the little guy can do about it.

13.a. When I make plans, I am almost certain that I can make them work.
b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

14.a. There are certain people who are just no good.
b. There is some good in everybody.

15.a. In my case getting what I want has little or nothing to do with luck.
b. Many times we might just as well decide what to do by flipping a coin.

16.a. Who gets to be the boss often depends on who was lucky to be in the right place first.
b. Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.

17.a. As far as world affairs are concerned, most of us are victims of forces we can neither understand, nor control.
b. By taking an active part in political and social affairs the people can control world events.

18.a. Most people don't realize the extent to which their lives are controlled by accidental happenings.
b. There is really no such thing as "luck."

19.a. One should always be willing to admit mistakes.
b. It is usually best to cover up one's mistakes.

20.a. It is hard to know whether or not a person really likes you.
b. How many friends you have depends upon how nice a person you are.

21.a. In the long run the bad things that happen to us are balanced by the good ones.
b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.

22.a. With enough effort we can wipe out political corruption.
   b. It is difficult for people to have much control over the things politicians do in office.

23.a. Sometimes I can't understand how teachers arrive at the grades they give.
   b. There is a direct connection between how hard I study and the grades I get.

24.a. A good leader expects people to decide for themselves what they should do.
   b. A good leader makes it clear to everybody what their jobs are.

25.a. Many times I feel I have little influence over the things that happen to me.
   b. It is impossible for me to believe that chance or luck plays an important role in my life.

26.a. People are lonely because they don't try to be friendly.
   b. There's not much use in trying too hard to please people, if they like you, they like you.

27.a. There is too much emphasis on athletics in high school.
   b. Team sports are an excellent way to build character.

28.a. What happens to me is my own doing.
   b. Sometimes I feel that I don't have enough control over the direction my life is taking.

29.a. Most of the time I can't understand why politicians behave the way they do.
   b. In the long run the people are responsible for bad government on a national as well as on a local level.

Short Form of the Manifest Anxiety Scale

Instructions:

For each question below, answer true or false. Place your answer on the answer sheet provided for you. There are no right or wrong answers to the questions, so simply give the answer that most closely resembles your actual feelings. Remember to place your answers on the answer sheet provided.

1. I believe I am no more nervous than most others.
2. I work under a great deal of tension.
3. I cannot keep my mind on one thing.
4. I am more sensitive than most other people.
5. I frequently find myself worrying about something.
6. I am usually calm and not easily upset.
7. I feel anxiety about something or someone almost all the time.
8. I am happy most of the time.
9. I have long periods of such great restlessness that I cannot sit long in a chair.
10. I have sometimes felt that difficulties were piling up so high that I could not overcome them.
11. I find it hard to keep my mind on a task or job.
12. I am not usually self-conscious.
13. I am inclined to take things hard.
14. Life is a strain for me much of the time.
15. At times I think I am no good at all.
16. I am certainly lacking in self-confidence.
17. I certainly feel useless at times.
18. I am a high-strung person.
19. I sometimes feel that I am about to go to pieces.
20. I shrink from facing a crisis or difficulty.

Modified Stanford Hypnotic Clinical Scale for Adults

(Patient may be seated in any kind of chair with arms, or may be in bed, sitting or lying down.)

Introductory Remarks

In a moment I shall suggest to you a number of experiences which you may or may not have and a number of effects which you may or may not produce. Not everyone can have the same experiences or produce the same effects when hypnotized. People vary greatly. We need to know which experiences you can have so we can build on them and know how to make hypnosis best serve you. Please remember always to respond to what you are feeling, so we can use hypnosis in ways that are natural for you.

Induction

Please close your eyes and listen carefully to what I say. As we go on, you will find yourself becoming more and more relaxed....Begin to let your whole body relax....Let all the muscles go limp....Now you will be able to feel special muscles groups relaxing even more. If you pay attention to your right foot, you can feel the muscle in it relax.... feel the muscles in the right lower leg relaxing...in the right upper leg relaxing....Now on the left side concentrate on the way that the left foot is relaxing...and the left leg, how the lower part and the upper part are both relaxing.... As you have become relaxed, your body begins to feel rather heavy. Just think of the chair(bed) as being strong, sink into it, and let it hold you...Your shoulders... neck...and head, more and more relaxed....The muscles of your scalp and forehead, just let them relax even more....All of this time you have been settling deeper and more comfortably into the chair(bed).

Your mind has relaxed too, along with your body. It is possible to set all worries aside. You mind is calm and peaceful. You are getting more and more comfortable....You will continue to feel pleasantly relaxed as you continue to listen to my voice....Just keep your thoughts on what I am saying...more and more deeply relaxed and perhaps drowsy but at no time will you have any trouble hearing me. You will continue in this state of great relaxation until I suggest that it is time for you to become more alert.... Soon I will begin to count from 1 to 20. As I count, you will feel yourself going down further and further into this deeply relaxed hypnotic state. You will be able to do all sorts of things that I suggest, things that will be interesting and acceptable to you. You will be able to do them without breaking the pattern of complete relaxation that is gradually coming over you....1 - you are becoming more deeply relaxed...2 - down, down into a deeper, tranquil state of mind...3-4 - more and more relaxed...5-6-7 - you are sinking deeper and deeper. Nothing will disturb you. You are finding it easy just to listen to things that I

say...8-9-10 - halfway there...always deeply relaxed...11-12-13-14-15 - although deeply relaxed you can hear me clearly. You will always hear me disinctly no matter how hypnotized you are....16-17-18 - deeply relaxed.

Nothing will disturb you...19-20 - completely relaxed.

You can change your position any time you wish. Just be sure you remain comfortable and relaxed.

You are very relaxed and pleasantly hypnotized. While you remain comfortably listening to my words, I am going to help you learn more about how thinking about something afffects what you do. Just experience whatever you can. Pay close attention to what I tell you, and think about the things I suggest. Then let happen whatever you find is happening, even if it surprises you a little. Just let it happen by itself.

1. Moving hands together (or, if one arm is immobile, go to 1a. Hand lowering) All right, then....please hold both hands straight out in front of you, palms facing inward, hands about a foot apart. Here, I'll help you. (Take hold of hands and position them about a foot apart.) Now I want you to imagine a force attracting your hands toward each other, pulling them together. Do it any way that seems best to you -- think of rubber bands stretched from wrist to wrist, pulling your hands together, imagine magnets held in each hand pulling them together -- the closer they get the stronger the pull...As you think of this force pulling your hands together, they will move together, slowly at first, but they will move closer together, closer and closer together as though a force is acting on them...moving...moving...closer, closer....

(Allow ten seconds without further suggestion, and note extent of motion.) That's fine. Everything is back to normal now. Just place your hands in their resting position and relax. (Score + if hands move slowly toward each other, and are not more than six inches apart at end of ten seconds.)

1a. Hand lowering (alternative to Moving hands together) If one hand is immobile for any reason, we recommend substituting a hand lowering suggestion, similar to that given as Item 1 in SHSS-C. The arm is held straight out at shoulder height, with the palm of the hand up. The suggestion is given to imagine something heavy in the hand pressing it down. After a few suggestions of downward movement, if the arm is not complete down, a 10-second wait is introduced. The item is passed if the hand has lowered at least six inches by the end of the 10 seconds.

2. Dream
Now I am going to ask you to keep on relaxing, and this time you are going to have a dream...a real dream...much like the kind you

have when you sleep at night. When I stop talking to you very shortly, you will begin to dream. Any kind of dream may come....Now it is as though you are falling asleep, deeper and deeper asleep. You can sleep and dream about anything you want to. As soon as I stop talking, you will begin to dream. When I speak to you again in a minute or so you will stop dreaming if you are still dreaming, and you will listen to mee just as you have been doing. If you stop dreaming before I speak to you again, you will remain pleasantly and deeply hypnotized. Now just sleep and have a dream.

(Allow 1 minute. Then say:)

The dream is over, but you can remember it very well and clearly, very clearly....I want you now to tell me about your dream while remaining deeply hypnotized. Please tell me about your dream... right from the beginning. Tell me all about it. (Record verbatim.)

(If subject has no dream:) That's all right. Not everyone dreams.

(If subject hesitates, or reports vaguely: probe for details.)

Inquiry: How real would you say your dream was?

Termination: That's all for the dream. Remain as deeply hypnotized as you have been.

(Score + if subject has an experience comparable to a dream...not just vague fleeting experiences or just feelings or thoughts. The dream should show imagery, some reality, and not give evidence of being under voluntary control.)

3. Hallucination (FLY) (Time: 55 seconds)

I am sure that you have paid so close attention to what we have been doing that you have not noticed the fly which has been buzzing about you....But now that I call your attention to it you become increasingly aware of this fly which is going round and round about your head...nearer and nearer to you...buzzing annoyingly...hear the buzz getting louder as it keeps darting at you....You don't care much for this fly....You would like to shoo it away...get rid of it....it annoys you. Go ahead and get rid of it if you want to.... (Allow 10 seconds)

There, it's going away...it's gone...and you are no longer annoyed...no more fly. Just relax, relax completely.

(Record score. Score (+) for any grimacing, any movement, and acknowledgement of effect.)

4. Posthypnotic Suggestion (Clearing throat or cough)

5. Amnesia

Stay completely relaxed, but listen carefully to what I tell you next. In a little while I shall begin counting backwards from ten to one. You will gradually come out of hypnosis but you will be the way you are now for most of the count. When I reach "five" you will open your eyes, but you will not be fully awake. When I get to "one" you will be entirely roused, as awake as you usually are. You will have been so relaxed, however, that you will have trouble recalling the things I have said to you and the things you did. It will be much easier just to forget all that has happened until I say to you: "Now you can remember everything!" You will not remember anything until then. After you wake up you will feel refreshed. I shall now count backwards from ten, and at "five," not sooner, you will open your eyes, but not be fully aroused until I reach "one." At "one" you will be fully awake. A little late I shall tap my pencil on the table like this (demonstrate with two taps). When I do, you will feel the sudden urge to clear your throat or to cough. And then you will clear your throat or cough. You will find yourself doing this but you will forget that I told you to do so, just as you will forget the other things, until I tell you. "Now you can remember everything." All right, ready -- 10-9-8-7-6-5-4-3-2-1.

(If subject has eyes open:) How do you feel? Do you feel alert?

(If groggy:) The feeling will go away soon. You feel alert now!

(If subject keeps eyes closed:) Please open your eyes. How do you feel?

(If groggy:) You are beginning to feel more alert and refreshed....You feel alert now!

(Hypnotist now taps pencil against table twice. Wait ten seconds.)

(Score + if patient clears throat or coughs after pencil tap.) Now I want to ask you a few questions about your experience. Please tell me in your own words everything that has happened since I asked you to close your eyes.

Record subject's responses verbatim. If blocked, ask, "Anything else?" and record answers until subject reaches a further impasse.)

Listen carefully to my words. Now you can remember everything. Anything else now?

(Again record subject's responses verbatim. Remind subject of any items not recovered; note these also.)

(Score + if subject recalls no more than two items before memory is restored.)

(If subject is awake and comfortable:) That's all now, you are completely out of hypnosis, feeling alert and refreshed. Any tendency that you may have to clear your throat or to cough is now completely gone.

FOR CORRECTING DIFFICULTIES WHEN NECESSARY:

(If there is a residual difficulty, e.g., difficulty in restoring alertness or persistence of a cough, proceed as follows with appropriate suggestions:) Please close your eyes and drift back into hypnosis as I count to 5. 1-2-3-4-5...Now I am about to arouse you by counting backwards from 5 to 1. You will feel alert, refreshed, with no tendency to cough. (Wait ten seconds.) 5-4-3-2-1. Fully aroused!

Research Consent Form

You are invited to participate in a project of research which will be conducted at the Chicago Kidney Center. The purpose of the project is to help patients adjust more easily to the conditions and demands of kidney dialysis.

The project has the support and approval of Dr. Dunea and the staff at the Chicago Kidney Center. It has also been approved by the Institutional Review Board for the Protection of Human Subjects of Loyola University. It involves no risk to the participants. All information from the project will be kept confidential. No names will be used to identify any of the participants in the project. Instead, code numbers will be used to identify the information received from the participants. The results of the study will be publishwed as part of the chief researcher's doctoral dissertation, and may appear in some professional journal articles. Again, no names of participants will be used at any time.

In the project itself, medical information will be gathered from the charts regarding physical adjustment to dialysis. Patients will also be given paper and pencil tests to assess how they see their condition and how much stress they experience. About forty-five (45) participants will be selected to have ten weekly meetings with either Michael Tobin, the chief researcher, or with Vicki Breitowich, the dietician at the Center. These meetings will involve either an educational program about adjusting to the dialysis condition, or they will involve a program of relaxation and pleasant mental images, that is, hypnotherapy, to make adjustment to dialysis easier. Both of these programs are designed to help dialysis patients experience more control over their medical condition. All participants who have these weekly meetings will be assessed for how well they respond to hypnotic suggestions by the chief researcher. While only forty-five patients can be given these programs at one time, once the first ten weeks have passed, the rest of the participants in the project are free to have the weekly meetings also.

Any questions regarding any part of the project will gladly be answered by the chief researcher, Michael Tobin. Participants are free to withdraw from the project at any time if they wish, with no consequences. The results of the project will be made available to all participants.

The nature and purpose of this project have been fully explained to me. I understand that I am under no obligation to participate, and that I am free to withdraw from the project at any time in the future. I also understand that all information in the project will be kept confidential, and that at no time will my name be used in the project or in the results. I also understand that I will be given a copy of this consent form, and that the results of the project will be made available to me.

I freely and voluntarily consent to participate in the research project, and I give the chief researcher, Michael Tobin, authorization to use medical information from my chart as part of the project, with the understanding that my identity be kept strictly confidential at all times.

Signature of Patient	Date
Signature of Patient	Date

APPENDIX B

Description of the Hypnosis Treatment

(1) Pre-hypnosis interview. The experimenter inquired how the subject was feeling; How well was he/she doing with the diet and fluid restrictions? Were there specific complaints? etc. The subject's most recent hypnotic session was discussed: any questions or complaints? What were the most/least enjoyable aspects? What did he/she hope to receive/achieve from this session? The experimenter then utilized the information from this interview in shaping the subsequent hypnotic treatment.

(2) Induction of hypnotic trance. Since all the subjects initially were hypnotized by means of the Stanford Hypnotic Clinical Scale, the experimenter used a modified version of that induction almost exclusively with all the subjects for all of their sessions. (See the scale in Appendix A.) Most subjects entered trance quickly after the first session. There were three exceptions. One subject failed to exhibit any hypnotic responsiveness when tested. The experimenter used an eye fixation induction with him each session with limited success. Two other subjects complained of feeling "nervous" at different periods during the treatment phase, and they did not feel able to concentrate on the experimenter's voice. An eye fixation induction was used with one of them during one session successfully. The other subject required modified eye fixation inductions for six of her ten sessions.

(3) Deepening of trance. Following the model of Morrill (1978), the experimenter employed imagery as the method for deepening trance, e.g., "Imagine that you are in a very beautiful place...perhaps somewhere you've been before...or somewhere you've only seen...or dreamed about..." The experimenter usually suggested that the subject indicate when he/she was experiencing the image, through ideomotor signalling, e.g., "...and when you feel yourself in that beautiful place...a finger on your left/right hand can move to let me know..." The experimenter then usually suggested that the subject would experience "even deeper relaxation and peace than the last time you were in trance."

(4) Therapeutic suggestions. Once the subject was deeply relaxed and in trance, the experimenter proceeded to make individualized suggestions designed to foster a sense of mastery/control/confidence/ self-esteem. These suggestions generally fell into four categories:

(a) direct ego-building suggestions, e.g., "...and the more comfortable and relaxed you are, the more comfortable you are becoming with yourself...feeling better and more confident about who you are...and that confidence can grow...naturally...each day...";

(b) indirect suggestions of mastery and self-control, e.g., "now, see if you can picture yourself doing something which you do very well...like riding a bike...or driving a car..." The subject was then instructed to tell the experimenter, "while remaining in trance," what he/she was doing in the image. The specific components of the task were then discussed by the experimenter, e.g., "...now you can see yourself shifting into third gear while you watch the traffic in your rear view mirror and prepare to turn left at the next corner..." Eventually, the explicit suggestions of mastery were given to the experimenter, e.g., "...and it is interesting, isn't it, how you can learn to do...such a difficult, complex task ...so effortlessly ..." The steps of mastery were highlighted, e.g., "and how did you learn to do such a difficult thing?.... Perhaps you can remember...trying...and not getting it all the first time...but you kept trying, didn't you?... and eventually it became something you could do almost without trying!";

(c) specific suggestions about compliance. Frequently, the experimenter linked other suggestions to the matter of compliance to the diet, e.g., "and as you feel stronger and more in control of your life, you can find it easier to keep to your dialysis diet..."; or "perhaps there are other difficult tasks...like going along with the fluid restrictions of dialysis...that you can learn to accomplish..." With subjects who evidenced a capacity to respond to post-hypnotic suggestions, the experimenter planted such suggestions, e.g., "and this feeling of confidence and control will continue all week long, and will help you to control how much you drink..."

(d) suggestions idiosyncratic to the subjects, e.g., certain subjects were given suggestions for pan control, others to relax at home, some to sleep better, control anger, etc. These stemmed from the pre-hypnotic interviews with the experimenter.

(5) Awakening. At first, the subjects were all awakened by a direct command from the experimenter who counted "from one up to five...when I reach five you will be completely awake and refreshed..." After one or two sessions, subjects were awakened in this manner: "when you feel comfortable and ready, you can awaken at your own pace."

(6) Post-hypnotic interview. When the subject awoke, the experimenter inquired how he/she felt and how the experience had gone, noting anything that was useful for future sessions. When the experimenter was satisfied that the subject was oriented and

feeling good, an agreement was made to meet again the next week, and the session was terminated.

Description of Coaching Treatment

(1) Education. During the first session, each subject was taught (again) the meaning of the BUN and potassium values and what foods/behaviors contribute to elevated values. (Almost all patients already know all of this information). The restrictions on fluid intake were then discussed. Typically, this is the most difficult part of the regimen for the patients. The subject was asked what situations made it easier/harder to keep the restrictions, and the subject was encouraged to try to do his/her best with the difficult task. Specific suggestions, e.g., measuring cups for food and fluid intake, or chewing gum instead of drinking water, etc., were made whenever appropriate.

(2) The laboratory reports. At the first session, and once a month during the treatment phase (two times), the "chemistries," i.e., laboratory reports of BUN and potassium values, were reviewed with each subject. Any dangerous values or notable changes from the previous month were discussed with the subject. Improvement was praised, and the subject was encouraged to discuss what, if anything, he/she was doing differently.

(3) Discussion and encouragement. Each other session consisted of greeting the subject, inquiring how he/she was feeling, and inquiring about efforts to adhere to the regimen's restrictions. All questions were answered (in the case of the experimenter, sometimes a question unrelated to the compliance criteria was written down and taken to the dietician for an answer, then brought back to the patient), and certain recommendations were made when appropriate. At each session, the subject was encouraged to "hang in there and keep trying."

APPENDIX C

One Way ANOVA Test of Changes in Overall Compliance Among the Coaching Groups, the No Treatment Group, and the Internals

Source	DF	SS	MS	F	P
Among	3	1.77	.59	.65	.59
Within	45	40.92	.91		
Total	48	42.69			

One Way ANOVA Test of Changes in Weight-Gain Among the Coaching Groups, the No Treatment Group, and the Internals

Source	DF	SS	MS	F	P
Among	3	4.05	1.35	1.38	.26
Within	45	43.98	.98		
Total	48	48.03			

One Way ANOVA Test of Changes in Potassium Adherence Among The Coaching Groups, the No Treatment Group, and the Internals

Source	DF	SS	MS	F	P
Among	3	.44	.15	.47	.70
Within	45	13.87	.31		
Total	48	14.31			

One Way ANOVA Test of Changes in BUN Adherence Among the Coaching Group, the No Treatment Group, and the Internals

Source	DF	SS	MS	F	P
Among	3	551.60	183.97	1.72	.18
Within	45	4812.80	106.95		
Total	48	5364.40			

One Way Analysis of Variance (ANOVA) of Changes in Overall Compliance Among the Six Groups

Source	DF	SS	MS	F	P
Among	5	7.97	1.59	2.10	.077
Within	62	47.02	.76		
Total	67	54.99			

One Way ANOVA Test of Changes in Weight-Gain Among the Six Groups

Source	DF	SS	MS	F	P
Among	5	9.41	1.88	2.25	.06
Within	62	51.85	.84		
Total	67	61.26			

One Way ANOVA Test of Changes in Potassium Adherence Among the Six Groups

Source	DF	SS	MS	F	P
Among	5	1.22	.243	.87	.50
Within	62	17.28	.279		
Total	67	18.50			

One Way ANOVA Test of Changes in BUN Adherence Among the Six Groups

Source	DF	SS	MS	F	P
Among	5	1062.40	212.48	2.01	.089
Within	62	6543.59	105.54		
Total	67	7605.99			

Results of Multiple Regression Regarding the Selected Independent Variables and Pretreatment Overall Compliance

Source	DF	SS	MS	F	P
Age	1	3.99	3.99	2.02	.16
Sex	1	16.66	16.66	8.41	.0051*
Education	1	1.82	1.82	.92	.34
Time on Dialysis	1	0.21	0.21	.11	.74
Error	63	124.74	1.98		
Total	67	149.42			

*Significant at .01 level

Results of Multiple Regression Regarding Selected Independent Variables and Pretreatment Weight-Gain Compliance

Source	DF	SS	MS	F	P
Age	1	5.76	5.76	2.75	.102
Sex	1	20.31	20.31	9.71	.0032*
Education	1	1.64	1.64	.78	.38
Time on Dialysis	1	1.13	1.13	.54	.46
Error	63	131.79	2.09		
Total	67	160.63			

*Significant at .005 level

Results of Multiple Regression Regarding Selected Independent Variables and Pretreatment Potassium Compliance

Source	DF	SS	MS	F	P
Age	1	.87	.87	1.32	.25
Sex	1	1.84	1.84	2.80	.10
Education	1	1.53	1.53	2.32	.13
Time on Dialysis	1	.53	.53	.81	.37
Error	63	41.57	.66		
Total	67	46.34			

Results of Multiple Regression Regarding Selected Independent Variables and Pretreatment BUN

Source	DF	SS	MS	F	P
Age	1	1995.14	1995.14	6.52	.0053*
Sex	1	2076.08	2076.08	6.78	.009*
Education	1	511.96	511.96	1.67	.20
Time on Dialysis	1	.43	.43	.00	.97
Error	63	19290.86	306.20		
Total	67	23874.27			

*Significant at .01 level

Results of Multiple Regression Regarding Selected Independent Variables and Posttreatment Overall Compliance

Source	DF	SS	MS	F	P
Age	1	5.96	5.96	3.40	.07
Sex	1	12.75	12.75	7.27	.009*
Education	1	5.31	5.31	3.17	.08
Time on Dialysis	1	.72	.72	.41	.52
Error	63	110.51	1.75		
Total	67	135.25			

*Significant at .01 level

Results of Multiple Regression Regarding Selected Independent Variables and Posttreatment Weight-Gain

Source	DF	SS	MS	F	P
Age	1	12.43	12.43	6.46	.013+
Sex	1	13.80	13.80	7.17	.009*
Education	1	7.02	7.02	3.65	.06
Time on Dialysis	1	.40	.40	.21	.65
Error	63	121.30	1.93		
Total	67	134.95			

*Significant at .005 level
+Significant at .05 level

Results of Multiple Regression Regarding Selected Independent Variables and Posttreatment Potassium Adherence

Source	DF	SS	MS	F	P
Age	1	.62	.62	1.18	.28
Sex	1	.68	.68	1.29	.26
Education	1	.69	.69	1.31	.26
Time on Dialysis	1	.23	.23	.43	.51
Error	63	32.97	.52		
Total	67	35.19			

Results of Multiple Regression Regarding Selected Independent Variables and Posttreatment BUN Adherence

Source	DF	SS	MS	F	P
Age	1	1209.41	1209.41	3.67	.06
Sex	1	1722.13	1722.13	5.22	.025*
Education	1	798.55	798.55	2.42	.12
Time on Dialysis	1	28.58	28.58	.09	.76
Error	63	20780.80	329.85		
Total	67	24539.47			

*Significant at .05 level

APPROVAL SHEET

The dissertation submitted by Michael P. Tobin has been read and approved by the following committee:

Dr. Gloria J. Lewis, Director
Associate Professor & Chairperson, Counseling and Educational Psychology, Loyola

Dr. Marilyn Susman
Assistant Professor, Counseling and Educational Psychology, Loyola

Dr. Jack A. Kavanagh
Professor & Chairperson, Curriculum and Human Resource Development, Loyola

Dr. Billie S. Strauss
Clinical Associate Professor
Department of Psychiatry
University of Illinois at Chicago

The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval by the Committee with reference to content and form.

The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

November 18, 1986
Date

Director's Signature